CALIFORNIA
OIL WORLD
and Petroleum Industry

Tulsa Public Library
Tech. Technical Dept.
Tulsa, Okla.
267-F

IT HAS THE OIL WORLD IN A WHIRL

THE NEW BAKER CEMENT WASH-DOWN WHIRLER FLOAT SHOE

ON YOUR NEXT JOB USE A BAKER CEMENT WASH-DOWN WHIRLER FLOAT SHOE (Or Wash-Down Whirler Guide Shoe . . . this new principle is available in both types) YOU'LL LIKE THE RESULTS.

THIS NEW WHIRLER PRINCIPLE TYPE OF SHOE *HAS EVERYTHING*

See for Yourself

1. **GUIDING** is easily and efficiently done, due to the rounded nose of the concrete guide which leads the casing past all side wall irregularities . . .
2. **FLOATING** is safely performed due to the "BALL TYPE" Back-Pressure Valve which provides a leak-proof seal against either high or low pressure and affords strength beyond the collapsing point of the casing . . .
3. **REMOVING BRIDGES** and **WASHING DOWN** is accomplished by the downward, hydraulicking action of the circulating fluid through the baffled "Down-Whirler" ports . . .
4. **WASHING FORMATION** at the cementing point to condition the hole preparatory to cementing, is another Result . . .
5. **BETTER CEMENTING** is accomplished by the definite DOWNWARD as well as the UPWARD whirling action imparted to the cement in its travel around the shoe and up and around the casing . . . this action insures best possible encasement of the pipe with a uniform body of cement - - - little danger of channelling here!
6. **DRILLABILITY** is always assured when you have only "Baker-Formula" Concrete and a minimum amount of Bakelite to drill up into small, harmless fragments that circulate out of the hole.

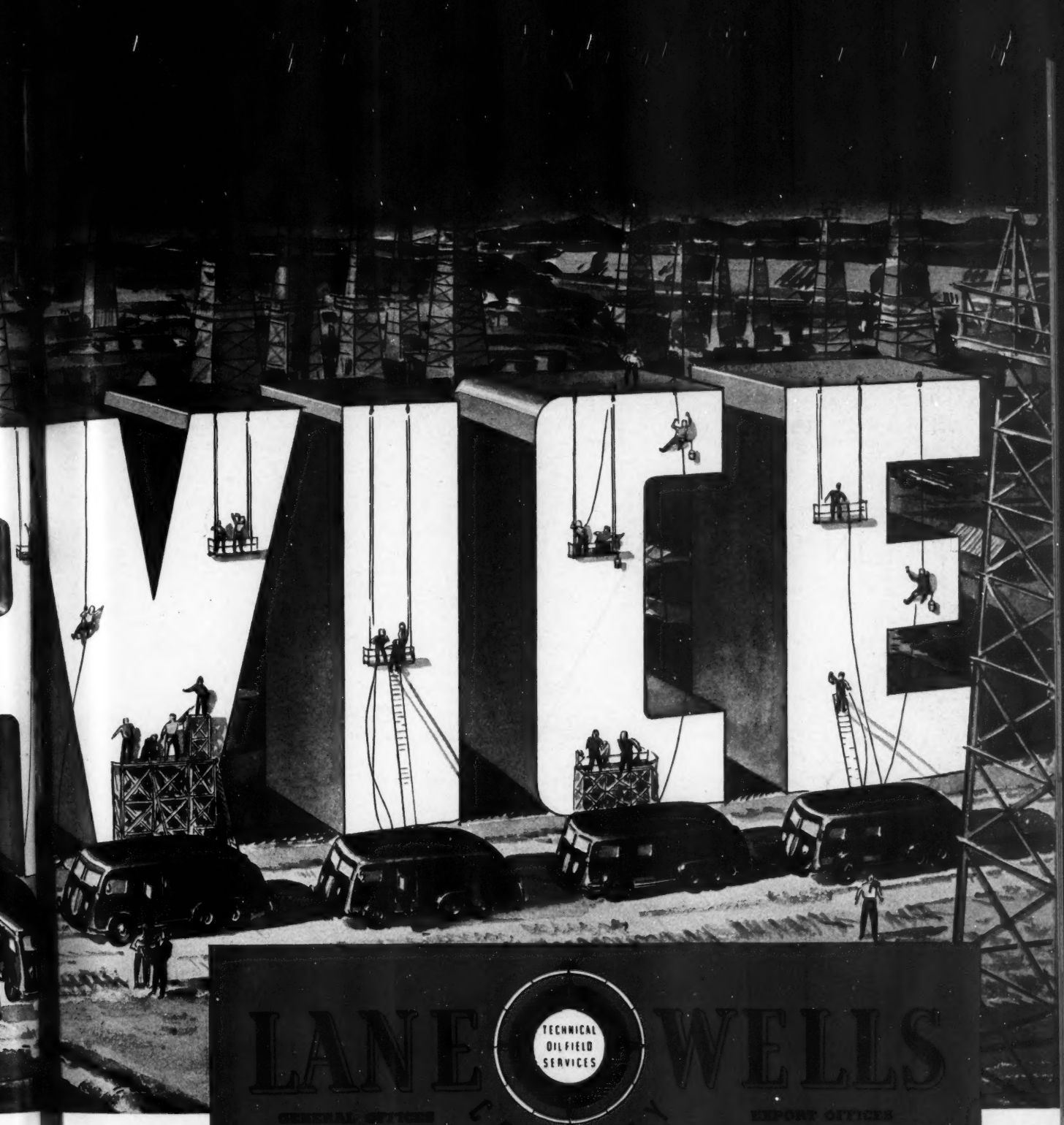
The New Baker Cement Wash-Down Whirler Float Shoe Has the Same STRENGTH VALVE EFFICIENCY and DRILLABILITY Found in All Baker Cement Guiding Floating Cementing Equipment

Send for New ILLUSTRATED FOLDER DO IT Now!

BAKER OIL TOOLS, INC.

"DURING the past six years the Lane-Wells Company has developed and perfected new tools and services for the Oil Industry and has acquired others through purchase. At every step, executives of the Lane-Wells organization have followed one policy—better, more complete services to the Oil Industry. Today, each distinct division of Lane-Wells operation receives the benefit of contact and counsel from the others. Every service, every product is being bettered and improved wherever such improvement is possible. The operators will profit from the use of these modern services through a more efficient handling of his field and engineering problems. Lane-Wells personnel are carefully selected and highly trained to satisfactorily perform every requirement in their service to the Oil Industry. We of the Lane-Wells Company again pledge ourselves to continue and to improve each and every service we offer."

(Signed) W. T. WELLS, *President*



Tomorrow's Tools Today

Gun Perforating. For efficient "selective" production on new wells and for restoring old wells to production.

Electrical Open Hole Logging. A method of determining producing strata in open holes through a combination of proved and established technic.

Oil Well Surveying. Designed to meet every well condition encountered in drilling or in completed wells in either open or cased holes.

Directional Drilling. Including knuckle joints and accessories, whip stocks and mills, together with full advisory and rental service.

Bridging Plugs. A modern means of positively sealing off depleted or water flooded sand.

Packers, Liners and Hangers. A full range of these tools to meet every need and requirement.

CALIFORNIA
OIL WORLD
and Petroleum Industry

THE AUTHORITY ON THE CALIFORNIA OIL INDUSTRY

JULY 20, 1938
VOL. 31 » NO. 14
WHOLE NO. 1517

IN THIS ISSUE

Controlled Directional Drilling 3

Signal Hill—17-Year Wonder Field 9

Development of Northwest Long Beach Extension 13

Hilldon Discovers Northwest Extension 16

Men Who Made Signal Hill Oil Field 19

C. N. G. A. Section 25-32

Water Conditioning By Evaporator Method 27

Water Treatment Highly Important 30

Laugh This Off 36

State Drilling Report 37

Los Angeles Basin Development 41

San Joaquin Valley Development 45

Coastal Development 48

PETROLEUM PUBLISHERS, INC. PETROLEUM SECURITIES BUILDING
LOS ANGELES, CALIFORNIA - MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

WALTER C. MONROE	President and Editor	R. N. RICHEY	Assoc.-Editor
M. S. FOX	Vice-Pres.	DAVIS E. BROWNE	Secty.-Treas.
R. C. CONINE	Assoc.-Editor	L. O. MILLER	Advertising Manager

W. E. AUSTIN, Manager, California Oil World News Service

California Oil World and Petroleum Industry is published twice a month at 536 Petroleum Securities Bldg., 714 West Olympic Blvd., Los Angeles, California. Entered as Second-class Matter January 1, 1937, at the post office at Los Angeles, California, under the Act of March 3, 1879. Subscription price: $1 per year in U. S. and possessions, $2 in foreign countries, including Canada. Member of the Audit Bureau of Circulations.

Telephone Number RIchmond 2136

Controlled Directional Drilling High Point

in Petroleum Engineering Development

Numerous minor developments in petroleum engineering and technology have been responsible for the phenomenal advance the drilling art has made in the past ten years. At relatively long intervals, however, there comes to the driller a major invention which completely revolutionizes his operations and gives him far greater control in drilling and completing oil and gas wells. Among these outstanding innovations were the weight indicator, perfected inclination and orientation survey instruments, electrical well logging devices, improved and specialized mud fluids, blow out preventers, the gun casing perforator, drillable liners, and, the tools and technique with which this article will deal at length. These are the tools and technique developed for deflecting a well to a chosen subsurface location.

When the driller discovered that his wells often drifted far from the vertical into an unfavorable structural position, or in a crooked course which would make placing of the well on production difficult, and pumping unfeasible, he set about to find means of keeping the bottom of the hole as nearly under the derrick floor as possible. Through weight control, speed of rotation, bit selection, drill stem design, circulation volumes and other factors, the driller soon achieved what was to all practical purposes the ideal vertically drilled "straight" hole.

As the driller perfected his control over his equipment, he began to consider directional control other than vertical to enable him to save wells which barely missed the pay because of a fault line, or to permit him to exploit rich oil formations which could not be reached by vertical drilling because of physical surface conditions directly over the desired subsurface location. Controlled directional drilling, Douglas Ragland, of Humble Oil & Refining Co., explains briefly, is the art, based on the sciences of geometry and mechanics, of drilling bore holes in such a manner that the course of a given hole can be predetermined. There are two approaches, says Ragland, to the directional control of drilling wells: first, methods involving deflection tools which may be oriented so as to produce deflection in predetermined directions; and second, methods utilizing bit control gained through the choice of bit, drilling weight, rotary speed, and drill collar assembly used. Deflection tools are mechanical means of causing the path of a bore hole to deflect from a straight line. The most widely used mechanical means for controlled directional drilling are the Lane-Wells Knuckle Joint, and the Eastman Whipstock and Spudding Bit. The Lane-Wells Knuckle Joint was formerly known as the Lewis Knuckle Joint.

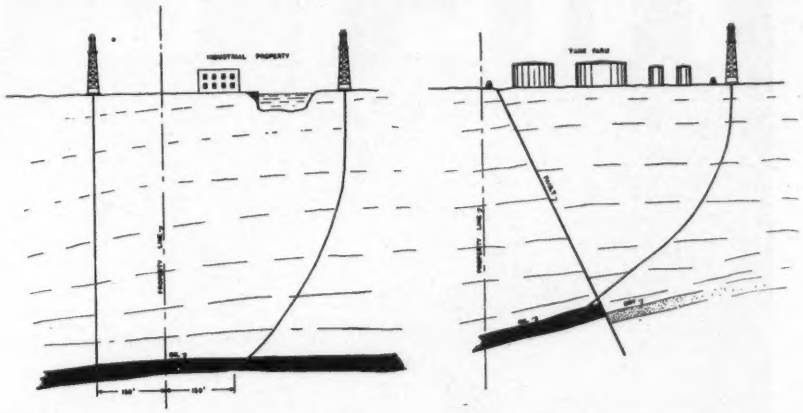


Figure 1 shows the construction and operation of the Lane-Wells Knuckle Joint. This directional drilling tool is built to drill at an angle to the axis of the drill pipe and has a drilling assembly which is connected to and rotated by the drill pipe through the medium of a universal joint. The drilling assembly is maintained at an angle to the drill pipe and in a fixed direction to the drill pipe by means of a spring actuated cam in the form of a sleeve with a beveled upper end. The beveled upper part of this cam is pushed up against the square shoulder below the flexible joint by the spring. The pressure of this cam against the square shoulder causes the drilling assembly to assume an angle with the axis of the drill pipe.

Returning to Figure 1, the operation of the Lane-Wells Knuckle Joint is described as follows: The inclination and direction of the hole being known, it is easy to calculate the direction in which to orient the Knuckle Joint in order to obtain maximum results from each run in deflecting the hole toward the desired objective. It is operated with normal rotation of the drill pipe and the usual mud circulation. The whole tool rotates, circulation is maintained at bottom, and danger of sticking is eliminated. Before running a Knuckle Joint the last ten feet of hole should be drilled quickly with a slow pump and the bottom of the hole should be squared off with a flat-bottomed bit. The diamond point bit is used with the Knuckle Joint for drilling in formation; when deflection is from a cement plug, the rotary shoe is substituted. After orienting the Knuckle Joint into the hole, the Kelly is put on and the Knuckle Joint is circulated down to bottom. The circulation is then shut off and the bit is set on bottom.

Weight of five points with six lines is applied when the Knuckle Joint has been lowered to bottom. The tool is then raised and lowered several times to form a recess for the bit. Circulation is tested during this operation. When no more progress can be made by setting down, the weight indicated above is applied and the pump is run just fast enough to maintain circulation. The tool is now on bottom in the position shown in the first of the five diagrams in Figure 1. The table is eased around for several revolutions with care being taken that the weight is maintained at the desired amount and that the circulation is steady. Then drilling is continued at a speed of from 10 to 20 r.p.m.

The ball-and-socket joint enters the small hole as drilling progresses, the knuckle straightens up and the drill pipe takes care of the necessary curvature for continuing the hole in the new direction. See second diagram, Figure 1. Drilling with the Knuckle Joint then continues for about 20 feet, which provides ample hole for a survey reading. See third diagram. The tools are then pulled, a single-shot survey reading is taken in the Knuckle Joint hole and the Follow-Up Bit is run on the same double to make twenty feet more of small hole. See fourth diagram. At this point the

TRET-O-LITE

For many years this company's large staff of specially trained chemical engineers, working in the most modern laboratories, has acted as a guide to the petroleum industry in the progress that has been made in reducing crude oil emulsions and S. S. to pipe line requirements. Our advisory service is yours for the asking.

TRETOLITE COMPANY

Manufacturing Chemists

DALLAS • SAINT LOUIS LOS ANGELES

Representatives in all Principal Fields

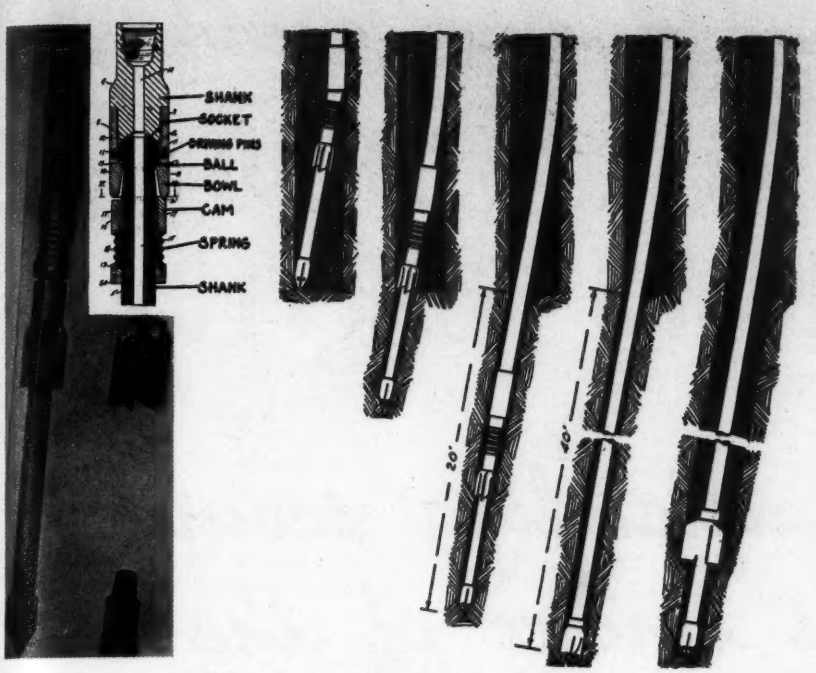


Figure 1. The Lane-Wells Knuckle Joint.

hole is again checked for inclination and direction and is then enlarged to full size with the Pilot Reamer Bit. See fifth diagram.

Figure 2 shows the construction and operation of the Eastman Whipstock. This tool consists of a single, steel casting, usually about 10 feet long, with a chisel point to engage the bottom of the hole and prevent turning, a tapered, concave face to guide the Whipstock bit to one side of the hole, and a ring or collar on top, by means of which the tool is withdrawn from the hole. Two specially designed bits used in conjunction with the Whipstock, one a fishtail design for soft formations, the other is of a roller design for drilling hard formations, are shown in Figure 2. Both of these bits are larger in diameter than the bore of the Whipstock ring, and are proportioned to shoulder the ring from beneath for Whipstock running and removal purposes.

The Whipstock is generally run as follows: A joint of flexible drill pipe, usually of about 3½-in. O. D., is made up on the bottom of the regular drilling string, in place of the usual drill collars, and is threaded through the Whipstock ring. The Whipstock bit is then made up on the drill pipe and shouldered in the ring, in which position a shear bolt is screwed through the ring and into a thread in the bit shank, thus fixing the Whipstock with relation to the pipe so that it can be oriented. Upon reaching bottom the Whipstock is faced in the desired position, and weight applied to force the sharpened end of the Whipstock into the bottom of the hole and secure it against rotation. Additional weight is then applied which shears the bolt screwed into the bit and allows the bit to drop from its shouldered position beneath the Whipstock ring. The bit and drill pipe are then free to move downward and rotate independently of the Whipstock.

The bit is rotated slowly, 20 to 30 r.p.m., down the face of the Whipstock with practically no weight on bottom, thus digging into the wall of the hole without disturbing the setting of the whipstock, until the bit reaches the lower end of the Whipstock. At this point the weight on the bit is rapidly increased, 8000 to 13,000 pounds, without increasing the rotating speed so that the flexible drill pipe is caused to assume a curved position while rotating. Since the Whipstock bit at this point is resting at one side of the hole in front of the Whipstock, the downward force on the flexible drill pipe causes the pipe to bend away from the bit and lie against the face of the Whipstock. This increased weight is maintained while the bit drills about 20 feet of deflected hole. The pipe is then picked up until the bit again shoulders beneath the Whipstock ring and the Whipstock is removed from the hole.

Finally, a pilot bit, designed to ream without sidetracking, is used to enlarge the Whipstock bit hole to full gauge. The Eastman Spudding Bit, adaptable to deflection work carried out in very soft formations, consists of a chisel shaped steel forging with a tool joint box at the upper end and a circulation passage through the center. This tool is used for controlled deflection work by running on flexible pipe and orienting as with any deflection tool, and then spudding and circulating with from 10,000 to 20,000 pounds weight on bottom, but without rotation, until several inches of new hole is made or the bottom of the hole assumes the shape of the tool. This attained, the Spudding Bit is removed, leaving the bottom of the hole slightly deflected in the direction the Spudding Bit was faced. The deflection work is completed by means of a small bit run below a joint of very flexible drill pipe. Upon reaching bottom, the small bit seeks the offset depression left by the Spudding Bit, and an application of considerable weight causes the drill pipe to bow away from the small bit to the side of the hole opposite the depression. Twenty or so feet or rathole is drilled below this point with the pipe in its flexed position, and then reamed to full gauge with a pilot bit.

Direction control through the use of special bits and drill collar assemblies falls into two classes: first, flexible drill collar control, and second, stiff drill collar with bit control. Flexible drill collar control calls for a drilling assembly that is small enough in diameter and of sufficient flexibility to curve in the hole with the application of weight and remain curved in one plane while rotating. The flexible drill collar can be used to build up the deflection angle of a straight hole without changing its direction angle since the application of weight, aided by gravitational forces, causes the flexible drill collar to curve back against the low side of the hole and the bit to dig on the high side, building up drift angle. For a contrary result in a slant hole, if a small undergauge bit is run on an extremely flexible drill collar, the small bit will bottom on the low side of the hole causing the assembly to curve forward against the high side of the hole, and the bit will drill off on the low side, reducing the drift angle. This latter technique is especially successful where the drift angle is large, and the operation can be made still more certain by underreaming a short section at the bottom of the original hole so as to provide room for curving of the pipe.

The reverse of the flexible drill collar is the stiff drill collar, which is as large in diameter as the hole being drilled will allow, and sufficiently stiff that considerable weight can be run on bottom without causing the drill collars to flex or curve. The use of a stiff drill collar with bit control is especially adapted to drilling straight hole, whether vertical or slanted at a large drift angle, but also has application to directional

...the outstanding scouting and news service of the... Western Petroleum Industry

ADVANTAGES include:

A Complete Index. A Report on New Operators and Incorporations, **giving location, progress of development, field and executive personnel and where they can be reached.** ***A Drilling Summary of New, Redrilled and Abandoned Wells,*** **showing the exact location and carrying a week-by-week as well as a yearly comparison.** ***A Production Report*** **showing the established daily quota as against the daily actual production for every producing field in the state.** ***A Complete Drilling Report*** **giving detailed information on each active well in the state, showing casing progress, actual depth, formations and the drilling operations that are in progress.** ***A New Location Report*** **giving surveyed locations of all the new wells during the week.** ***A Completion Report*** **giving detailed information on all the completions during the week.** ***Large Printed Maps*** **covering new fields and fields which are creating interest because of the discovery of deeper sands, or for any other reason.**

CALIFORNIA OIL WORLD NEWS SERVICE

536 PETROLEUM SECURITIES BUILDING • PHONE RICHMOND 2136

MAIL THE COUPON BELOW. DON'T WAIT ANOTHER DAY FOR THIS VALUABLE INFORMATION...!

We would like further information regarding your News Service covering:
☐ COMPLETE CALIFORNIA REPORT ☐ SOUTHERN CALIFORNIA REPORT ☐ NORTHERN CALIFORNIA REPORT ☐ DAILY REPORT

Name_____

Company_____

Address_____

City_____ **State**_____

deflection, or drifting. In Figure 3 are shown two curves, drilling speed and average slope, both plotted against number of drill collars used on a large number of wells drilled. The size hole, 8⅝-in. and the size drill collars used, 6¾-in., O. D. x 3-in. bore, were the same in each case. Also each drill collar assembly consisted of one 17-ft. long-tapered drill collar used in conjunction with one or more regular drill collars, and run below a string of 4½-in. O.D. drill pipe.

The technique of drifting with stiff collar assemblies consists of effecting changes in the directional course of a hole through the use of especially designed bits and specified rotary speeds and bit weights. This technique is based on the following experimentally derived theory, according to Ragland: A blade type digging bit run on a stiff drill collar assembly and heavily loaded with from 6000 to 20,000 pounds net bit weight will tend to drift to the left if rotated at high speed, 50 to 125 r.p.m., and to the right if rotated at a low speed, 20 to 50 r.p.m., the right and left being designated when standing vertically and looking forward down the slope.

Figure 3 also shows types of bits which have been used with more or less success for bit control work.

Directionally drifted or deflected wells have been drilled and produced successfully at drift angles in excess of 60 degrees, traveling in excess of 850 feet horizontally for each 1000 feet drilled, to bottom sufficiently close to predetermined objectives to remain within the boundaries of small leases, to find producing zones beneath overhanging caprock structures, to form conduits for pumping heavy fluids to the bottoms of wild wells, and to reach otherwise inaccessible locations beneath oceans, deep lakes, and jagged peaks. Two or more holes have been drilled in different directions from a single location on swamps and lakes, and wells have been shifted across faults to make producers from dry holes, all at great savings of time and money.

The phenomenal success of controlled directional drilling projects could not have been possible without the well bore surveying instruments which permit the driller to keep a close check on the inclination and orientation of the hole. It has been pointed out that when a deflection tool is set in a vertical hole, the resulting deflection quite logically will be produced in the same direction as the deflection tool setting. A deflection tool which is set in a hole which is not vertical, however, may or may not produce a deflection in the same direction as the deflection tool setting, and the determination of this latter result is by no means a simple problem in solid geometry. The horizontal plat on page 8 shows what the surveying instrument reveals. The hollow square represents the derrick floor, and the heavy line, the course of the hole.

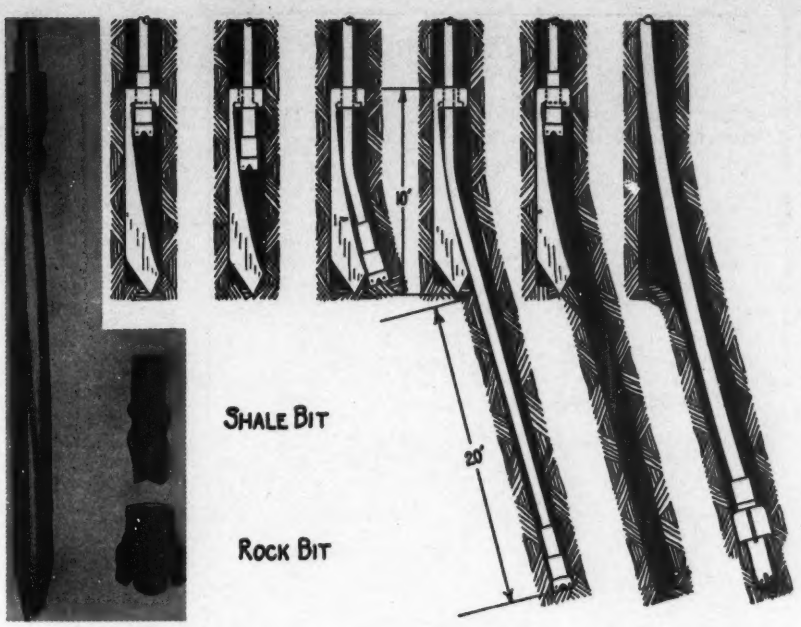
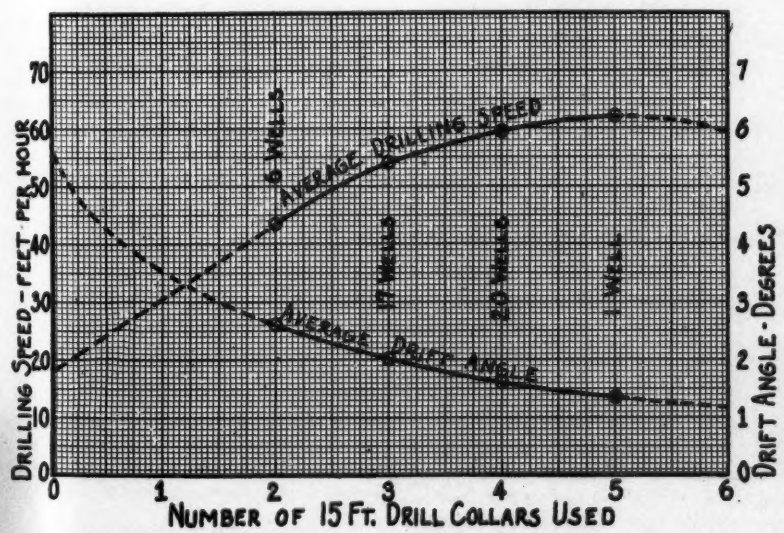
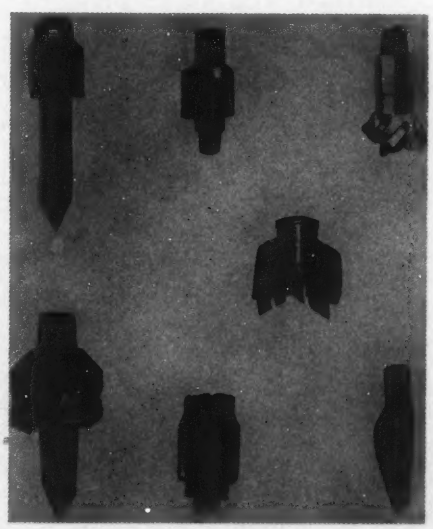
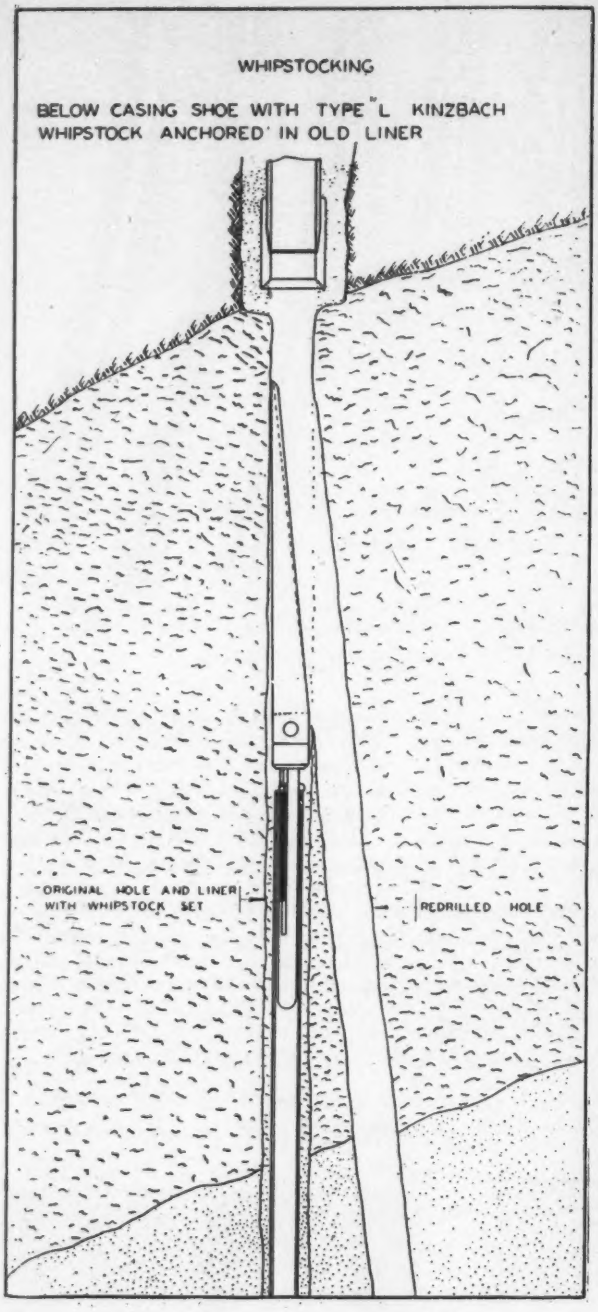


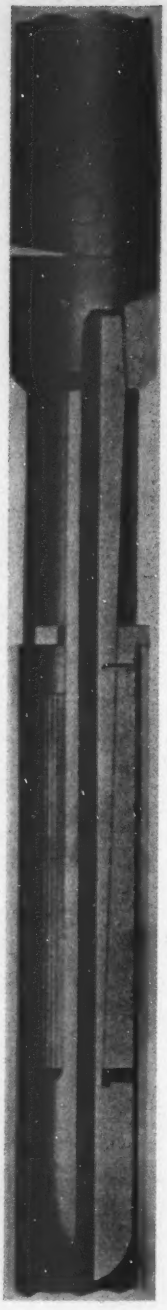
Figure 2. The Eastman Whipstock and Bits.

Figure 3. At left, relation of drift angle to drilling speed and number of drill collars used in stiff collar assembly. At right are special bits used with these collars.



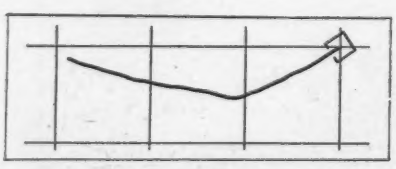



WHIPSTOCKING
BELOW CASING SHOE WITH TYPE "L" KINZBACH WHIPSTOCK ANCHORED IN OLD LINER
ORIGINAL HOLE AND LINER WITH WHIPSTOCK SET
REDRILLED HOLE



The diagram at left shows the Kinzbach whipstock anchored in old liner. Structural features of the tool are shown at right.

This article would scarcely be complete without the mention of another type of deflection tool. This is the



Horizontal well course plat

Kinzbach "Type L" Whipstock, which was developed to permit the deflecting of tools from a point below the casing shoe, after cutting out a section of liner. This particular stage of a redrilling job often entails considerable difficulty when attempted without the aid of a guide for the tools and, in many cases, requires the use of a cement plug at this point. Without the use of a cement plug and conventional deflection tools, the direction of the new hole cannot be controlled at its origin.

The Kinzbach Whipstock consists essentially of a spear arrangement with positive acting slips which grip the inner wall of the liner after they are in proper position to make the contact and the concave section is hinged so that the top is forced back against the wall of the hole as the assembly is set. The slips are actuated independently, and will grip the liner even though it might be ragged at the top. The hinge will not permit the concave to move too far back into the wall of soft formation. The Whipstock is run into the hole by means of a shearing stud in the conventional manner by attaching to the drill pipe. Upon entry of the spear into the liner the slips are automatically released and forced outwardly to contact the liner. By addition of more weight from the drill pipe, the slips are firmly seated in the liner and the stud is sheared, releasing the drill pipe from the Whipstock. At the same time the hinge is forced back so that the top of the concave lies against the wall of the hole. By orienting the Whipstock into the hole, the direction of the redrilled hole can be accurately controlled. The slips are so arranged that their full length contact the pipe wall. This is of particular advantage since it prevents any shifting of the Whipstock after it is once set.

This tool eliminates the risk of deflecting the hole from the pipe end and trusting this obstruction will not interfere with subsequent drilling operations, or that the bit will always follow the same course from this point. It avoids the placing of a cement plug as a base for deflecting tools at this point, a job necessitating considerable time and expense; it does away with the job of cutting or attempting to cut excess liner to clear the tools and pipe to be run in the redrilled hole below the casing seat. This means that 15 or 20 feet of liner might be removed below the shoe where, by other methods, 30 to 50 feet of removal might be required. It eliminates waiting until the hole has been redrilled past the top of the liner to begin directional work.

..Another tool developed by Kinzbach, the Sectional Whipstock, is reported to be in wide use for sidetracking junk, for straightening crooked holes or establishing a new drilling course, for redrilling work-over holes, for plugging back holes, and for directional drilling by orientation. Features of this tool are that it can be set at any depth, requiring no support from bottom; that a hinged feature insures that the top of the Whipstock will lie back against the wall of

(Continued on Page 17)

SIGNAL HILL SECTION

17 Years' Advance in Equipment and Technique Seen in Development of Wonder Oil Field

Spectacular as has been the development of Signal Hill oil field, it is no more so than the revolutionary improvements in drilling equipment and technique that made it's 17-year phenomenal advance possible.

From the light 10-in. x 10-in. twin engine and the little single speed No. 5 draw works used by Shell Oil Co. to drill Alamitos No. 1, to the modern heavy unitized equipment now drilling De Soto Oil Co.'s deep test in the Lovelady pool, there is a sweep of more than seventeen years of progress from the old method of blindly digging a hole in the ground to the present art of scientifically, rapidly and economically drilling a well, with full knowledge and control of its direction and of formations passed through.

In these years, the most notable result of drilling art refinement is the speed with which wells may now be drilled. For the year 1921, Alamitos No. 1 was drilled in exceptionally fast time, about three months. For a like amount of hole, De Soto's time was two weeks. Many technical factors enter into making the present speed records possible, a few follow:

Generally larger engines, pumps and draw works give the driller much more power with which to work.

Because drillers came to realize that less weight on the bit plus faster rotation and higher pump pressures makes faster and straighter hole, their instrument panel now includes a weight indicator always, a pump manifold pressure gauge, and a dial showing turntable revolutions, usually.

The use of ball and roller bearings on all shafts, and the development of roller bearing crown and traveling blocks has allowed high speeds and made bearing trouble a rarity.

New type brakes for the rotary drum materially speed up the running of drill pipe and casing.

Automatic cat heads contribute to much faster "round trips".

Drill pipes have been tremendously improved over the 6-in. 20-lb. string used in Alamitos No. 1, the best then available.

Hard metal facings have increased by many times the footage average per bit.

Scientifically designed bits, rock and drag, cut much faster than the old type fishtail, then used almost exclusively.

Laboratory tested muds minimize hole caving, pinching, and water loss to dry formations.

Drill collar type reamers in many cases eliminate necessity for long reaming jobs.

The development of rotary hoses, swivels, drive chains etc. capable of standing up under heavy usage, have eliminated many shutdowns due to breakage.

Improved tongs and elevators are much more easily and quickly operated, contributing to faster round trips.

Spectacular blazes fitted the mad tempo of early Signal Hill when speed meant everything.

The use of long heavy drill collars is one of the largest factors in drilling fast, straight, hole.

Very closely identified with speed is the development of instruments indicating deflection of the hole from vertical.

On June 25, 1921, Happy Yowell's crew brought in the well which opened the great Signal Hill Pool.

By periodically checking for possible deviation from the prescribed course, the driller knows whether to "pour it on" or ease off a point or two. Many holes have been lost because of too much drift, and redrill jobs are long and expensive. Similarly, the ability to deflect the course of the bit in any desired direction has opened possibilities undreamed of in the year 1921.

General

Many recent improvements in equipment and technique have contributed not only to speed but are very important in attaining mechanical perfection and maximum economy.

Semi-automatic, hydraulically operated blow out preventers not only save the loss of many holes and much expensive drilling equipment, but they also are life and accident insurance for drilling crews.

The newly developed methods for "drilling in" under pressure allow the use of light, gas-cut oil as circulating fluid, at the same time maintaining a very low bottom hole pressure and preventing mudding off of oil sands.

Mud screens and centrifuges remove bit cuttings, keep the mud free of abrasive sands and help the engineer to know the formation being drilled better.

The introduction of liners, adapters, packers etc. made from drillable metal eliminates costly fishing and redrill jobs.

Larger, more efficient and higher pressure boilers, together with super heaters constitute a big advance in power generation.

Insulation, forced drafts, improved burners and scientifically designed manifolds enormously increase boiler efficiency.

Automatic boiler feed pump and burner control reduce the fireman's duties to a minimum.

The practise of mounting slush pumps outside the derrick has not only made easier the work of the crew but has increased the efficiency of the pumps.

Super deep well equipment usually calls for a separate engine to drive the rotary turntable, often mounted beneath the derrick floor.

The use of vertical, rather than horizontal steam engines is becoming more and more common.

The process of cementing an oil well has grown from a long uncertain proposition to very nearly an exact science, thanks to close cooperation between cementing companies, equipment manufacturers and petroleum engineers. Many complicated casing programs are in use today which a few years ago would have been impossible.

Improved casing and tubing in themselves have contributed much to make modern deep wells possible.

Drilling rigs employing diesel, natural gas or butane internal combustion prime movers are now showing remarkable efficiency and fuel economy together with their inherent quality of portability.

The almost complete unitization of the modern steam or electric rigs constitutes a big advance over the old method of tearing out and installing each piece when moving equipment from one rig to another.

Of far more importance to the industry than speed are the technological advances which have taken place since Signal Hill produced its first barrel of crude. Coring as we know it today, appeared on the Hill soon after the discovery and rapidly became generally used to locate the oil sands. Later came the micro-paleontologist (bug man) who was not concerned with oil sands, but from a study of microscopic fossils found in shales, determined their general age and established a reliable system of correlations. The core barrel is perhaps the greatest single advance in the history of the oil business.

While at first cores were used to determine the presence or absence of oil sand and later as sources of data for correlation through fossil remains in shales, the tendency is now to detailed analysis of the sands. In the laboratory it is now possible to tell accurately whether a sand contains water, oil or gas. If the sample shows the presence of water, its salinity may be calculated. Sands, which to the eye are apparently barren, may, by latest methods, be shown to contain either light oil or gas. Even the gravity of the oil may be determined. A far cry, indeed, from the so called "Texas barrel" used in Alamitos No. 1 which if lucky, recovered a few inches of either shale, sand which looked wet or sand which appeared to contain oil.

Apart from core analysis, another great aid in locating productive horizons is the formation tester. Before the introduction of this implement it was necessary to cement an expensive water string over a sand to be tested. Beside the cost of pipe and cement, this method had two other serious drawbacks. First, a time loss of at least a week, and second, the necessity of reducing the hole size when drilling is resumed.

With a modern tester any formation may be adequately tested in a few hours by simply reaming a shoulder on which to set the wall packer, and running the tester on the drill pipe. Of equal importance to the industry is the use of this tool in determining whether or not water has been shut off by casing. After the cement has been drilled out five feet below the casing shoe, the tester is set near the bottom and opened for a specified time. The answer is obtained in the composition and quantity of the fluid recovery. Thus a great saving of time is made over the old method of bailing or swabbing down the fluid level in the pipe.

Another development of major importance to the industry is that of electrical logging. Almost unbelievable are the results obtainable by these devices which consist simply of a set of electrodes lowered down the well and a set

MANY OF THE MOST COMMONLY EXPERIENCED DRILLING DIFFICULTIES ARE DUE TO THE USE OF IMPROPER DRILLING MUD

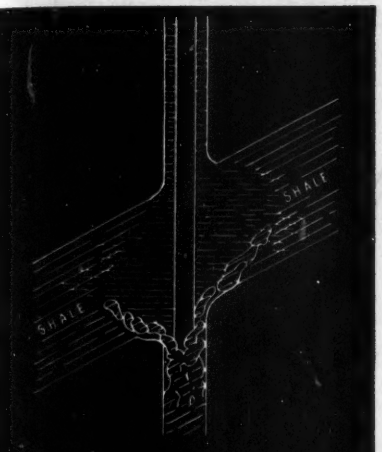
Caving hole, stuck drill pipe, blowouts—these and other difficulties encountered in drilling through heaving or caving shale often can be eliminated by the use of BAROID Products.

AQUAGEL—either used alone with water or as an admixture—builds a thin cake on the walls of the hole and reduces the loss of water to the formation, thus eliminating some of the causes of trouble with heaving shale.

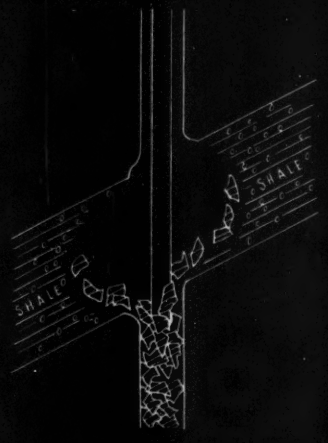
Where weighted muds are required to hold the formation in place or to confine oil, gas, or water to their respective formations, a combination of BAROID and AQUAGEL yields a mud of low viscosity and high unit weight; a mud which is non-corrosive and which will release gas readily.

Since shales frequently raise the viscosity of drilling mud to the point where it easily becomes gas-cut, STABILITE can be added before the danger point is reached to maintain a thin mud and release entrained gas.

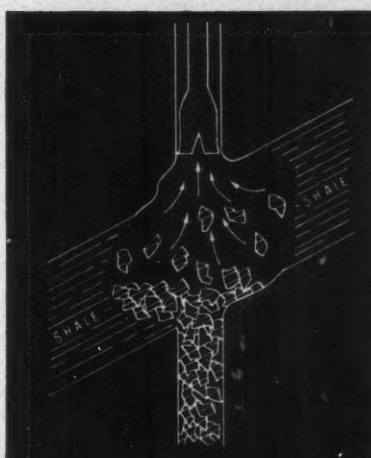
To help prevent drilling difficulties, always use BAROID Products. They have been successful in thousands of wells.



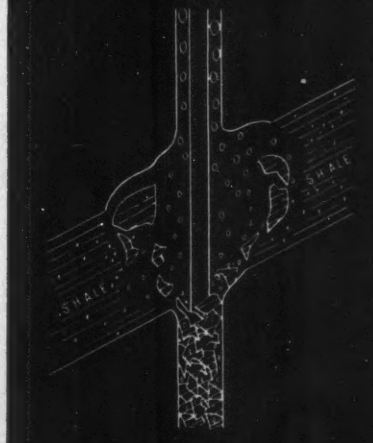
Hydrous Disintegration of Shale. Water from drilling mud causes swelling and disintegration of the shale, forcing it to heave into the open hole. A drilling mud with good wall-building qualities, i.e., low water loss, will help check this cause of heaving shale.



Gas Pockets Which Cause Shale to Heave. Shale impregnated with gas will slough into the open hole unless the drilling fluid has sufficient weight to control the gas pressure.



Swabbing Effect of Drill Pipe. Too rapid withdrawal of drill pipe creates a pressure differential which causes shale to hedve into hole. The use of a drilling mud which forms only a thin, but impervious, cake will aid in reducing the swabbing effect.



Gas-Cutting Effect. Mud which contains entrained gas has lost much of the weight necessary to prevent shale from caving. The use of a thin mud which does not readily gas-cut is essential in drilling heaving shales in pressure zones.

BAROID PRODUCTS

BAROID—Extra-Heavy Drilling Mud. • AQUAGEL—Trouble-Proof Colloidal Drilling Mud. • STABILITE—An Improved Chemical Mud Thinner. • BAROCO—An Economical, Salt Water-Resisting Drilling Clay. • FIBROTEX—For Preventing or Regaining Lost Circulation in Drilling Wells.

Stocks carried and service engineers available in all active oil fields. Look for this trade mark under "Oil Well Drilling Mud" in your classified telephone directory for our nearest service engineer and distributor.

BAROID SALES DEPARTMENT

NATIONAL PIGMENTS & CHEMICAL DIVISION OF

NATIONAL LEAD COMPANY

BAROID SALES OFFICES • LOS ANGELES • TULSA • HOUSTON

of recording instruments mounted in a truck. Readable from the logs are depth, thickness, character, saturation, porosity, and permeability of all formations passed through, a great aid in subsurface correlation. From the lines on the log also may be interpreted points of water entry, oil sands, gas sands, fault zones, depth of casing and cement. And all this at small cost in time and money to the operator.

Hand in hand with the better understanding of formations gained from coring and electrical logging has been the development of gun perforating. This means of opening to production formations which have previously been cased off has brought out an entirely new technique in oil well engineering, making possible, in some cases, the completion of wells otherwise due for abandonment.

Production

In no way overshadowed by improvements in drilling are those made in the realm of oil production. Seventeen years ago a given well either flowed or it pumped. If it flowed, the yield was restricted by passing through a bean or flow nipple which was simply a solid bar of steel three inches in diameter and eight inches long through which was bored a hole. Beans could be obtained in any size in 64ths of an inch. This was because that was the size graduation of the drills used in making the holes. These were threaded on each end and made up in the christmas tree—all that was necessary to change the bean size was to open the line on the other side of the tree, close the line on the side to be changed, break a union, unscrew the old flow nipple and make up again with the new one. Alamitos No. 1 flowed through such an arrangement. De Soto No. 1 will probably flow through a bean built on the principle of the needle valve, no more difficult to adjust than turning the handle of your hot water tap at home. The size of the opening will be plainly readable on a scale—in 64ths.

Early pumping wells on Signal Hill were equipped with one of a half dozen or so cup type pumps. As these were all that the market offered, the same pump had to be used for all gravities of oil, regardless of water and sand content. Today a myriad of good pumps are offered embodying new principles and especially designed for use under specific fluid conditions.

Compact, economical pumping units, driven by natural gas or electricity are replacing the old steam or heavy gas engine powered band wheel pumps.

The practise of gravel packing liners is now becoming general in fields where running sands are troublesome.

Yet in its infancy, the science of acid treating oil wells is now showing the tremendous possibilities it holds for the future.

But little more than an idea when Long Beach first became an oil field, the injection of gas as a means of making a well flow without rods came into general use as soon as the first flush was off. From the simple procedure of applying dry gas at the casing head, many and varied types of gas flow devices have been evolved, each suitable to the particular conditions for which it was designed. The Long Beach field has been the proving ground for many of these which are now in use throughout the world.

Scientific analyses of production problems, gas-oil ratio study, fluid level determinations, bottom hole pressure interpretations and rod torque computations have resulted in materially increased production rates at lower lifting costs.

Improved gas traps, devices for measuring production either by volume or weight and tank vapor recovery systems all have done their part in reducing losses and cutting overhead.

Investigation of the electrolytic action of salt water produced with oil is today resulting in savings amounting to thousands of dollars in lengthened life of pipe lines and tankage.

Chemical and electrical methods of dehydrating wet oils enable each operator to clean his own product and ship only clean oil.

Portable well pulling rigs have materially cut maintenance costs by eliminating the slow old-fashioned calf wheel.

Exploration

While methods of drilling wells, producing them, and handling their products have been steadily improved, so also have been the methods used to locate oil structures. In 1921, the only means known was by making a study of surface conditions and drawing inferences from them as to subsurface structure. The discovery of Signal Hill was a near perfect example of work of this type. However as the number of likely looking surface structures neared the point of exhaustion, various geophysical methods came into use in order to locate fields buried beneath later alluvial fills. Many recent discoveries testify to the efficacy of geophysics.

The remarkable progress in all phases made by the oil business since the memorable day in June, 1921, when Alamitos No. 1 was completed, is due entirely to the progressive and intelligent attitude of the men of the industry. Engineers of the supply and service companies have always been eager to cooperate with those of the drilling and producing companies to the ultimate advantage of California's largest industry—oil. And for the past 17 years, at least, Signal Hill has been the trial horse for practically every innovation of importance.

Blowout preventers and other investment and life-saving equipment would have saved the early Signal Hill operations lots of grief.

Development of the Northwest Long Beach

Extension 16 Years After Signal Hill

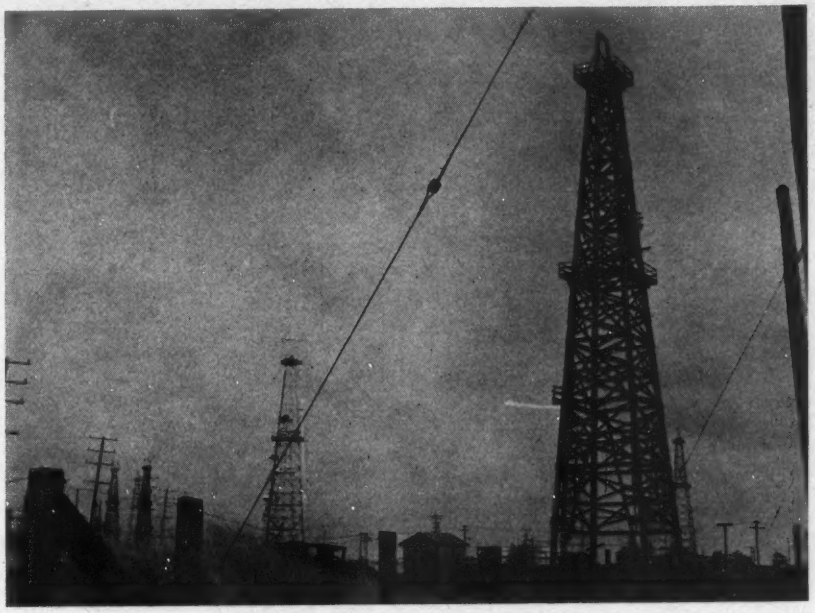
By Robin Willis,
Geologist, Hilldon Oil Co.

The area of flush production, opened up by the Hilldon Oil Company in 1937, marks the most northwesterly extension of the productive area of the Long Beach field. It is situated west of the Los Cerritos subdivision and extends northwest on the west side of the Pacific Electric tracks from Wardlow Road across the Flood Control channel. It is a separate structural accumulation, and oil is now being produced from three zones, while several others are known to be present.

Geology

The Cherry Hill fault extends northwest past the limits of the Long Beach field an undetermined distance. It lies along the west flank of the secondary dome which forms the Los Cerritos extension of the Signal Hill uplift. A portion of this dome has been faulted down on the west side of the fault, and it is this segment of the dome which has been developed by the Hilldon Oil Company.

Production is now confined to the block bounded on the northeast by the fault, with the possible exception of the Signal Oil and Gas Co., Pacific Electric 1. The fault has a throw of between 250 and 450 feet, probably decreasing to the northwest. On the southwest the structure is bounded by the normal southwest dip of the major uplift.

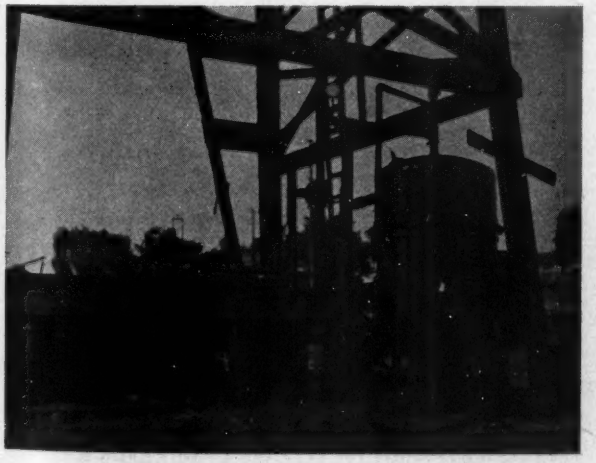


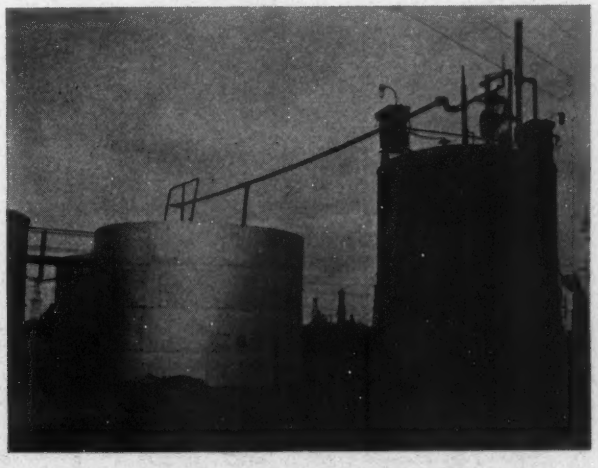
The derrick in the right foreground is that of the northwest extension discovery well, Amebco No. 1

To the southeast, along the fault, the beds form a saddle or gentle southwesterly-plunging syncline between the Hilldon area and the Pepper Drive area of Signal Hill. Closure here is about 300 feet. Production is continuous between the two areas, close to the fault, but the closure has been sufficient to protect the virgin pressures in the Hilldon area from depletion through production to the southeast.

To the northwest closure is formed by the plunge of the major uplift into the saddle between it and Dominguez Hill.

The structure as a whole may be compared with the western lobe of the Dominguez Hill fold, and with





Near the quiet little suburb of Los Cerritos, Hilldon Oil Co's. discovery well and later completions, utilize the latest producing, separating and metering equipment.

RUGGED • RIGID • RELIABLE

M-M Giants

DOMINATE THE RIO BRAVO FIELD

View of the Rio Bravo field from the air, showing part of on
M-M GIANT Steel Derricks on wells of the Superior Oil C

LOOK the length and breadth of the new, deep Rio Bravo field and count the GIANT M-M Steel Derricks.

NINE out of ten "tall" derricks in this field are M-M's. One is a veteran, built seven years ago, for use at Kettleman Hills. Already, 6 wells have been drilled under it... drilled at amazing speed and under unbelievably difficult conditions...wells that set *world's records* for speed at their depth (*10,000 feet in 24 days.*)

The first of these GIANTS was made by McClintic-Marshall for Steel Oil Derrick Company, Ltd. Now they are built for us by Bethlehem, successor to McClintic-Marshall, right here in California. Into them are put the results of our experience...GREATER STRENGTH, SAFETY, STABILITY and USEABILITY.

M-M Derricks are made and stocked here in all A.P.I. standard sizes. Special Derricks and Substructures are produced quickly, to order, in Bethlehem's Los Angeles plant.

WHEN BIGGER DERRICKS ARE REQUIRED, WE WILL BUILD THEM!

M-M GIANT on Helbling No. 1, Superior Oil Company, Rio Bravo field.

STEEL OIL DERRICK COMPANY, L

SUBWAY TERMINAL BUILDING • LOS ANGELES, CALIFO

Northwest extension. Wells invade Scenic Los Cerritos.

the Wardlow Road-Pepper Drive-Frog Pond lobe of the Signal Hill fold*, both of which are separated by faults from the main uplift, and constitute more prolific separate structural accumulations.

The stratigraphy of the Pliocene formations in the Hilldon area corresponds closely to that of the Pepper Drive area of the Long Beach field, and it is believed that all of the productive zones of that area will be present and will prove profitable. Five of them, from the Alamitos down nearly to the Miocene, have already yielded oil. The latter has been penetrated in the Hilldon, Dominguez 1, in which oil sand has been cored between 7340 and 7786 feet.

The structure constituting the northwest extension is reflected on the surface by the topographic high on the west side of the Pacific Electric tracks, centering on Wilmington Street, which indicates the presence of a western segment of the Los Cerritos dome. Analogy with Dominguez Hill and the Pepper Drive area lent sufficient weight to this evidence to warrant prospecting for the inferred accumulation.

The first well drilled with this possible structure as an objective was put down by the Marland Oil Company on the Los Cerritos tract in 1924. This well proved to be beyond the probable limits of the shallower production, though it cored oil shows before it was abandoned at 4502 feet.

The first well to produce from this structure was the Petroleum Securities, Bixby 2, drilled in 1929 to the uppermost, or Alamitos zone which it reached just below 4200 feet. This well is still pumping. It is located at the southeastern limit of the structure, where production is continuous with that of the Wardlow Road-Pepper Drive area, and its significance was overlooked for many years.

In 1936 the Shell drilled two wells on the block of leases now owned by the Hilldon Oil Company. The first was the Shell Amebco 1, located just south of Wilmington Street on the crest of the topographic rise. This well cored oil sand and was tested in both the first and second sands, but in both cases the sands were wet, and commercial production was not obtained. Hilldon, Amebco 3 and A. S. Johnston 33 have since been successfully completed up dip from this location, closer to the fault. Shell abandoned this well at a depth of 6387 feet.

The second well drilled by the Shell was its Flood Control 1, later to become Hilldon Flood Control 1. After coring only 15 feet of oil sand in the Alamitos, or top zone, Shell abandoned the well, which was taken over by the Hilldon Company, organized for that purpose. This company redrilled from a depth of 1300 feet. The first test was made at about 5700 feet, from a zone corresponding to the "Marine" zone of the Pepper Drive area. The well was then deepened to the lower part of this zone at 6100 feet. It was then plugged back and shot perforated successfully at the 5400-foot level, in the "Chik-san" zone, at 4500 feet in the Upper Brown zone, and finally at 4300 feet. In each of these varying amounts of production were obtained, ranging in rate from 30 to 275 barrels per day, with various percentages of water. After two attempts to exclude the water from the top zone failed, the well was abandoned. Its total production exceeded 6000 barrels.

Alamitos Zone Wells	Completion Date	Depth to Top of Zone	Initial or Peak Production Bbl./days
Hilldon Oil Co., Amebco 1	July 30, 1937	3988	940
Hildon Oil Co., Amebco 2	Sept. 16, 1937	4087	863
Hildon Oil Co., Amebco 3	Jan. 20, 1938	4150	679
Hilldon Oil Co., Flood Control 2	March 14, 1938	4085	628
Hilldon Oil Co., Flood Control 3	Oct. 23, 1937	3970	304
Hilldon Oil Co., Pool 1	April 23, 1938	4001	1004
Hilldon Oil Co., Pool 2	May 14, 1938	4063	393
Hilldon Oil Co., Pool 3	June 7, 1938	4038	1040
Union Oil Co., Oil Operators 1	Oct. 24, 1937	4106	520
Union Oil Co., Oil Operators 2	Dec. 14, 1937	4017	1625
Union Oil Co., Oil Operators 3	Dec. 5, 1937	3987	367
Union Oil Co., Oil Operators 4	March 22, 1938	4005	556
Richfield Oil Co., Bixby 4	March 10, 1938	4140	576
A. S. Johnston, Well 33	May 15, 1938	4179	265
Petroleum Securities Co., Bixby 2	April 6, 1930	4215	625
Signal Oil & Gas Co., Pacific Electric 1	May 26, 1938	3858	105
Upper Brown Zone Wells			
Winrock Oil Co., Harriman 1	April 4, 1938	4595	170
Winrock Oil Co., Enginas 1	June 13, 1938	4629	176
Richfield Oil Co., Bixby 5	June 19, 1938	4425	298
Hilldon Oil Co., Amebco 4	June 25, 1938	4394	213
Miocene Well			
Hilldon, Dominguez 1	July 3, 1938	7690	800

*Recent Developments in the Long Beach Oil Field, by Walter C. Crown, G. G. Peirce and Paul J. Howard, Summary of Operations, California State Mining Bureau, Volume 18, No. 2, 1932.

In July, 1937, the Hilldon Company drilled its Amebco 1 well, regarded by many as the discovery well of the structure, though actually it was antedated by both the Petroleum Securities well and the Flood Control 1. This well was completed in the Alamitos zone, found at 3988 feet, for an initial production of 940 barrels of 24° oil, cutting 0.1%, from a penetration of 55 feet of sand. It has proved since to be near the highest part of the block west of the fault.

The first successful completion in the second, or Upper Brown zone was made by Winrock Oil Company with its Harriman 1. After failing to make a successful producer in the first zone, this well was deepened into the uppermost part of the second, for 120 barrels per day. Though probably close to the edge of production, it has shown a remarkably steady yield at that figure.

The most recent development in the field is the completion of Hilldon Oil Company's Dominguez 1, formerly Caminol, Dominguez 1-8. This well cored oil sands between 7340 and 7786 feet, and is now producing from below 7700 feet. It started to flow as the perforating gun was being withdrawn, before the tubing could be run in, and made 800 barrels the first day through the 7-inch casing. This is the westernmost producer in the area, and greatly extends the possible limits of the field.

Development

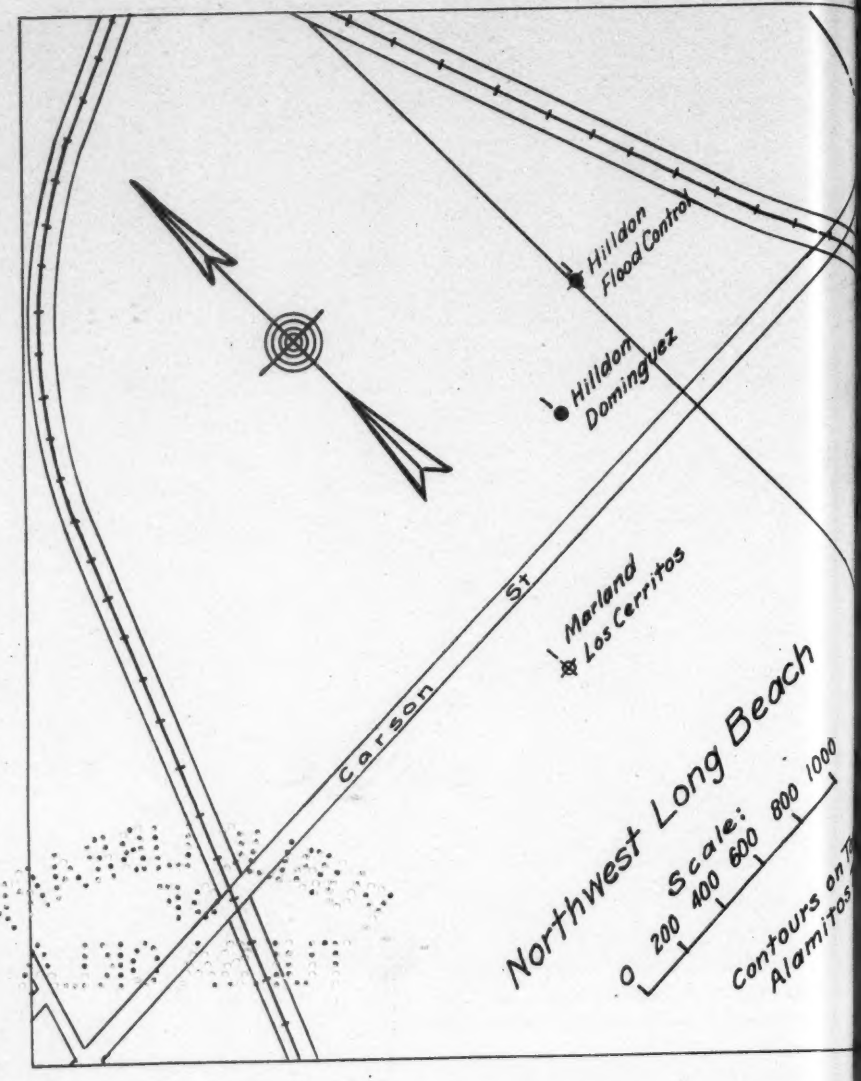
The present production of the Hilldon and adjoining leases is about 5000 barrels per day.

The principal development has been in the first, or Alamitos zone. There are now 16 wells, producing approximately 3800 barrels of 24° oil daily from this sand. It is reached at depths of from 3970 to 4200 feet, depending on structural and topographic position, and most wells have taken a penetration slightly in excess of 100 feet in the zone. The Union Oil Co., Oil Operators 4 and Hilldon Amebco 4 cored over 200 feet of saturated sand. Seven of the eleven wells producing from this zone came in flowing, and three made over 1000 barrels per day. The largest was the Union, Oil Operators 2, with a peak of 1625 barrels.

There are now four wells producing about 600 barrels of 22° oil daily from the second, or Upper Brown zone. These are not believed to be representative of the possibilities of the zone, as none is located high on the structure. The two Winrock wells are very near the lower limit of production on the west flank, and are producing from only a few feet of the sand, yet they have both shown practically no decline. The Richfield, Bixby 5 and the Hilldon, Amebco 4 are producing from about 100 feet of zone.

Mention has already been made of the Hilldon, Dominguez 1, which was brought in on July 3rd from a Miocene sand. This is the only well to date drilled to anything like this depth.

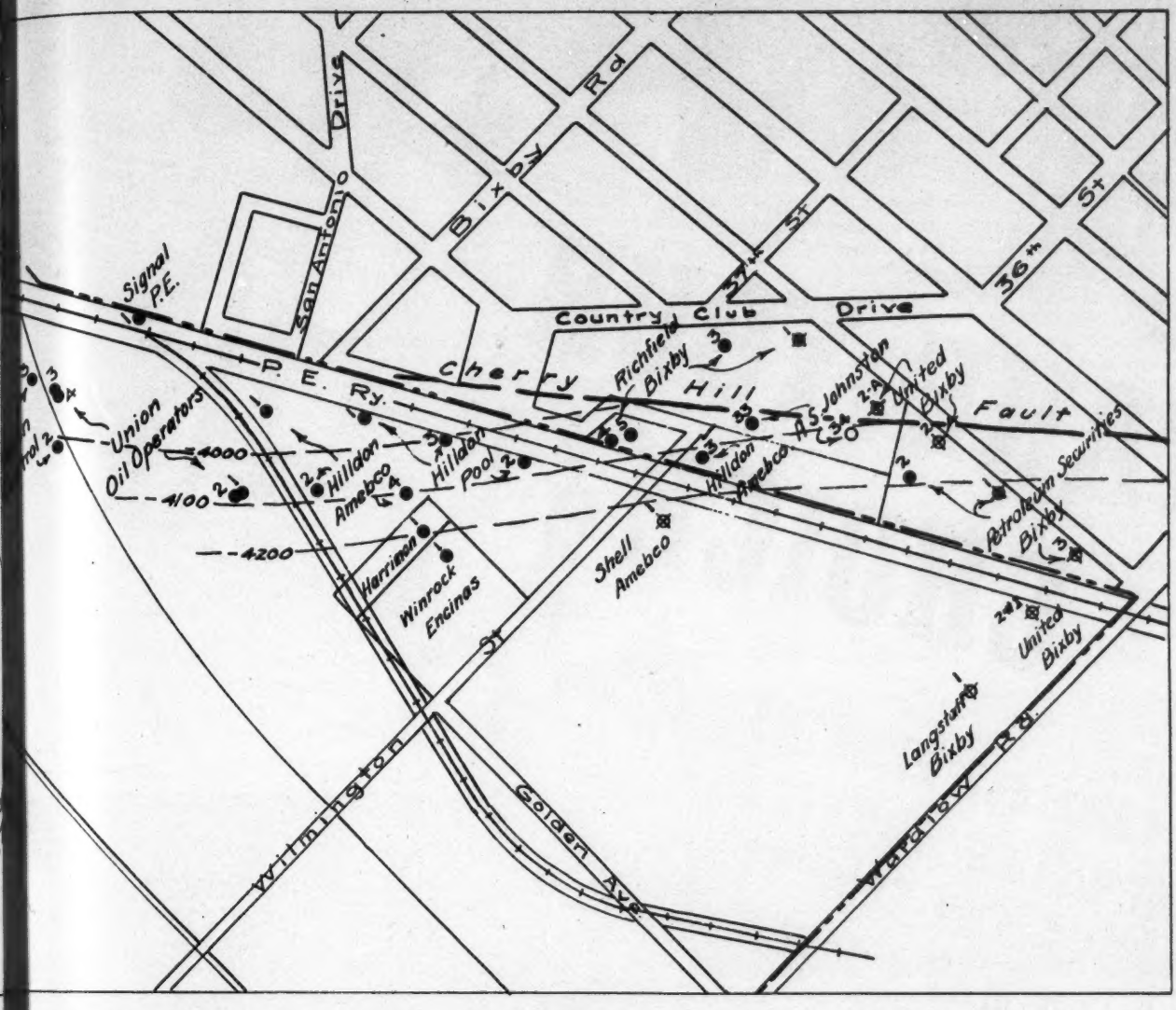
There is only one well drilling in the area at the present time, the A. S. Johnston 34.



Northwest Extension Discovered by Hilldon

The Hilldon Oil Co. was formed in 1936 for the sole purpose of acquiring and developing acreage northwest of the proven limits of the Long Beach field. Mr. Cornelius G. Willis, president and organizer of the company, was convinced by a thorough geological study of the area that the several dry holes drilled on and around his leases tended to prove rather than to disprove the presence of commercial production on certain portions, at least, of his holdings.

The existence of the Cherry Hill Fault in this part of the field was well recognized and excellent production previously had been developed on its southwest side in the main field. But it remained for Mr. Willis to properly interpret the results of former wells in the northwest area and discover the new extension. To "Neal" Willis and his brother, Robin Willis, goes full credit for the location of the discovery well, Amebco No. 1, and the more recent deep zone discovery well, Dominguez No. 1. Both are well known geologists and graduates of Stanford University where their father, Bailey Willis, made his famous earthquake studies, while heading the geology



department. Perhaps this paternal influence has some bearing on the sons' aptitude in locating faultline production.

Oddly enough, "Neal" Willis' main object in life is not bringing in oil wells where it is practically proven that no oil exists. It is, we are reliably informed, to be the first white man to sail a nine foot cat boat around the Horn in the dead of winter. At any rate, it's a fact that the science of geology must struggle along without benefit of Mr. Willis when opportunity arises for him to demonstrate his sea legs and maybe catch a tuna.

Robin Willis, geologist and engineer for Hilldon, has been associated with the company since its inception. "Bob" is a geologist with an unusually wide range of experience, having done work in nearly every important oil producing area in western United States and Canada. His studies of Texas and New Mexico Permian are outstanding.

No less important to the success of the company has been the full cooperation of other company officers who are secretary Thomas H. Work, treasurer J. W. Ash, and the directors, Howard S. Dudley, Dwight C. Whiting, J. F. Gilbert and Howard W. Wright who has recently resigned from the board because of an extended trip.

From the first, field work has been superintended by C. C. Winslow, who already well known, has materially added to his reputation by his efficient handling of the company's drilling program. Typical of "Cece" are several things; his nearest approach to serious mechanical trouble was when flood waters last March threatened to undermine a rig; his original drillers, Joe Dwyer, Nick Carter and Bill Rogers are still on the payroll; he does his fishing in the High Sierras. If you wish to meet him today, you must go to June Lake, but next month he will be back on the job and you may see him any Tuesday—at the Potrero Country Club for chicken dinner.

Completing the personnel is Charles Hall, production engineer. Mr. Hall is especially well known in the Signal Hill field where he has been in charge of production for several of the larger independent companies.

Directional Drilling

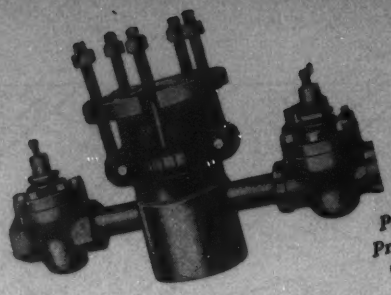
(Continued from Page 8)

the pipe at all times; that by setting in a coupling the window will always be within one joint of casing, eliminating the chance of parting the string; that positive setting of slips prevents all turning or downward movement of Whipstock at any time; that it can be oriented in the hole to mill out in any desired direction; that the Whipstock can be removed from the hole if desired, and, that the tool permits the cutting of a clean window which leaves no obstructions for subsequent drilling operations.

t 050
1938
V. 31 pt. 2.

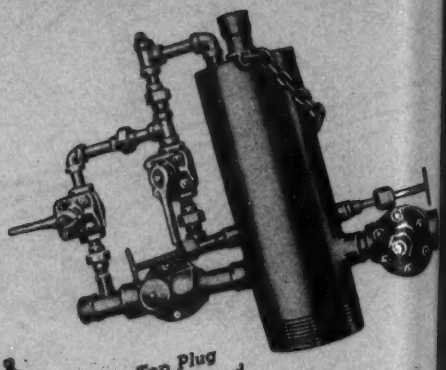
MacClatchie Casing Cement Head

Calmec Casing Cement Head

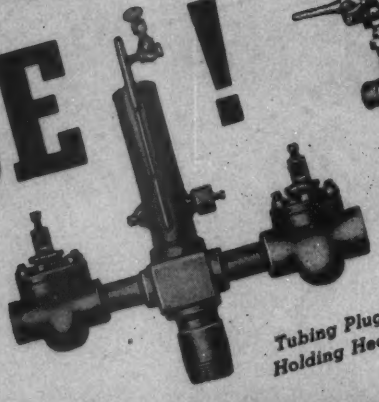


Perkins High-Pressure Tubing Cement Head

TAKE YOUR CHOICE!



Top Plug Holding Head



Tubing Plug Holding Head

THE COMPLETE PERKINS CEMENTING SERVICE INCLUDES ANY CEMENT HEAD YOU MAY PREFER

An example of the adaptability of Perkins cementing methods to the needs of the operator is the complete stocks of Cementing Heads carried at all Perkins branches. *From these stocks, the operator can choose the Cementing Head which he prefers.* All Cementing Heads are maintained in perfect working condition—and never go on the job without a previous rigid inspection.

For quickest, safest, most dependable cementing—always use Perkins. It Pays!

CEMENT HEADS STOCKED AT ALL FIELD OFFICES AT AVENAL, BAKERSFIELD, NORWALK, SANTA MARIA, TAFT AND VENTURA

Engineer and Cementer checking figures on the job

PERKINS *Cementi*

INCORPORATED

342 PETROLEUM SECURITIES BLDG., LOS AN

Men Who Made the Most Famous Oil Field

Signal Hill Was Once Subdivision Flop

By F. J. SHAVER

If one looks closely at a topographic sheet, issued by the United States Geological Survey, a small circle may be seen on the map located some two miles north of the City of Long Beach. The circle indicates the top of a hill and the words Signal Hill denote the name.

A property, or sub-division, map of the area around Signal Hill, issued prior to 1921, shows several large tracts of land and many small lots. Improvements, in the way of homes, had been few, the Pala house and the Denni residence, located near the top of the hill, were the most pretentious. Streets had been laid out and in some cases curbs constructed, but for the most part, property was unimproved and owners were anxious to sell, complaining of high taxes. Buyers were scarce and thus in the early part of the year 1921 Signal Hill was just another subdivision.

The possibility of an oil field in this area had been discounted in the minds of most oil men due to the fact that Union Oil Co. had, in 1916, drilled a well near the intersection of Wardlow Road and American Avenue to a depth of 3450 feet and abandoned the hole. F. F. Hill was drilling superintendent at this time for the Union Oil Co.

In the early part of 1921, two young geologists in the employ of the Shell Oil Company were sent to Southern California with instructions to report on possible fields in the Los Angeles Basin. These men were Dwight H. Thornburg and Jasper W. Paulsen, Jr. Upon theories advanced and conclusions reached, these men received permission to proceed with the leasing of certain tracts of land. A decision reached by the geological department of the Shell Company that Cherry Ave. represented the western productive limits of the field, was proven by later developments to be unfortunate, as some of the most prolific areas were discovered far west of this line. While the Shell Company later acquired a few leases west of Cherry Avenue, prices paid were far in excess of those asked during the early stages of development.

Upon completion of the leasing program early in 1921, a site was selected for the first test. This well was to be known as Alamitos No. 1, being situated on a lease from the Alamitos Land Co. just east of Temple Ave. and north of Hill St.

William C. McDuffie at the time was in charge of all operations for the Shell Company and he selected a young man by the name of O. P. "Happy" Yowell to supervise drilling operations. During the last week in March, Alamitos No. 1 was spudded in with rotary tools and completed as a producer on June 25th, at a depth of 3114 feet. The drillers on the well were Blondy Elder, W. F. Sharp and L. Tracy.

This completion started what is now known as the Signal Hill oil field. Derricks sprung up over night, unheard of bonuses and royalties were asked and given, tents were erected and buses provided free transportation from anywhere for people who were told in smooth language how to get rich by buying one hundredth of one per cent in a gusher. Many bought but few got rich.

During the following five or six years, the names of men engaged by companies in the various phases of development reads like a "Who's Who" in the oil business. William Reinhardt was placed in charge of operations at Long Beach for the Shell Company and later supervised Santa Fe Springs, Dominguez Hill and Redondo-Torrance, as well. O. P. Yowell was superintendent; working with him were: C. C. Kiefer, now living in Long Beach, Zeb Dyer, Chet Inman, now with Bell and Loffland, C. V. White, living on a ranch in the Ojai Valley, Charles Butler, who with Art Trout, master mechanic, placed the T. & B. head on the market. "Brick" Nidever, retired, was chief gauger; Tom Severance was in charge of production, assisted by Charlie Carlson. The warehouse was in charge of Tom Roots, un-

The big boss, William C. McDuffie, was all dressed up a minute before Alamitos No. 3 sent oil over the derrick. Happy Yowell, right, is probably muttering "Goodness Gracious!"

til recently with Richfield Oil Corporation, transportation was taken care of by Gene Tiffany; Norman Dorn, now with Lane-Wells Company, supervised the electrical department. Tool pushers included John Landers, now at Ventura; Fred Kneiff; Mat Schumacher; "Pinky" Robinson, now with O. P. Yowell; Henry Scanlon; Harry McMahan; Frank Kightlinger; W. R. Hanline, now superintendent for Bolsa Chica Oil Corporation; W. R. Thompson, retired and living near Ventura and George Griffith.

J. U. Stair, succeeded William Reinhardt upon the latter moving to the Los Angeles office and, in turn, F. E. Rehm was placed in charge. Logan Burrell was chief petroleum engineer, H. H. Dubendorff, deceased, petroleum engineer at Long Beach, was assisted by D. B. Collins, now in charge for the company at Houston, and C. L. Clark. Credit should be given to Dubendorff for the first sub-surface contour map of the field, based on the top of the Alamitos zone. Despite the facts that definite markers were not known, core barrels were not developed to a satisfactory stage, holes were later proven to be crooked and faults were not located, the map stands today as a distinct accomplishment.

While the Shell Company was busily engaged, other operators were not idle. The General Petroleum Corporation had secured the Black & Drake lease, located west of Cherry and the K. & H. property north of Willow. Genial Frank Banks was in charge, assisted by Bob Bain and Mike Burroughs. Ben Parsons and A. S. (Doc) Hayes, assisted in operations. Petroleum Midway Corporation was headed by T. J. Crumpton. Assisting him were I. W. Fuqua, and Jim Thompson. Tom Lloyd was in charge of part of the drilling, Davis and Haines contracting the balance. Al Craig and Al Carrey also assisted in the operations. Bush and Voorhees (later R. R. Bush Oil Co.) secured a small lease just west of Cherry Ave., known as the Bess. Walter Hughes directed the first wells, later Pugh and Miller did the drilling on other leases under contract.

Rogers and Edwards drilled many wells in the field, having Kaufman as superintendent. Several wells drilled by this firm for Henderson Petroleum Corporation were large and consistent producers. The A. T. Jergins Trust secured a lease on a tract of land owned by the City of Long Beach lying north of and adjacent to the cemetery. At that time, this location was considered

In 1921 the drillers had no idea whether they were running into 100 bbls. a day, or 20,000 bbls. The wild well crew was kept on the jump.

OIL IS LIFTED to a NEW LIFE ON WINGS OF AXELSON CAGES

1. Axelson Heavy Duty Cages are formed from bar stock after which milled areas between the wings are produced on duplex milling machines.

2. Semi-finished bore and measurements of milled areas are checked for accuracy by inspectors.

3. The semi-finished cages are carburized by pack hardening in a solid carbonaceous material.

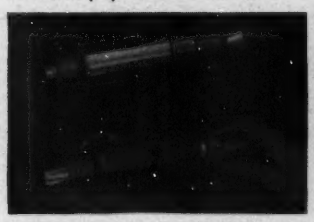
4. After carburizing the outside surface, the main body and the pin of the cage are turned to remove the carburized surface.

5. The carburized surface for the threaded portion on the inside is removed by boring. Burrs are removed with rotary file.

6. At this point of processing, cages are heated in an electric furnace to proper temperature, and quenched in oil.

7 After hardening by quenching, the cages are drawn in a Homo electric furnace and checked for proper Rockwell hardness.

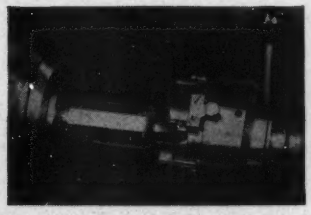
8. Cage threads to API specifications are tapped in lower end of cage after cage has been finish reamed to size.



9. The outside diameter of both body and pin of cage are finish ground to size on center and checked for proper tolerances.

Only a part of a pump, but note the care given to it in each of the thirteen operations illustrated, out of a total of fifty required. Dozens of other parts are needed to complete the pump, and each part requires many honest and unhurried operations—hundreds in the finished unit.

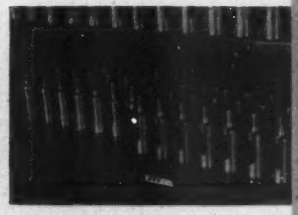
Equipped with the finest tools and machinery, Axelson factories are keyed to precision production. Here a thousandth of an inch is a big dimension. Not only are important parts checked to close tolerances, but also the tools that make them are being constantly inspected for accuracy. That's why it is safe and economical to buy Axelson products—anywhere on earth.



10. API specification sucker rod pin threads are produced on cage pin and gaged with both "Go" and "No Go" ring gages.

11. Inside diameter of wings is ground to permit diametral clearance of .040" to .050" when using standard API ball.

12. Checking radius of pin collar with precision radius gage is included as one of the many final inspections.



13. Cages are stamped, washed, oiled and then placed on steel shelving ready for assembling in pumps or shipment as spares.

THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

AXELSON

DEEP WELL PLUNGER PUMPS

SUCKER RODS

Axelson Manufacturing Company, P. O. Box 98, Vernon Station, Los Angeles • St. Louis • 50 Church Street, New York • Tulsa

Mid-Continent and Eastern Distributor: Frick-Reid Supply Corporation • Rocky Mountain Distributor: Great Northern Tool & Supply Company.

NAPHTHAS · FUEL OILS · DIESEL FUELS

KEROSENE · GASOLINE · INDUSTRIAL

AUTOMOBILE LUBRICANTS

BRIGHT STOCKS

Nine strategically located **SHELL** *Refineries*

CALIFORNIA

COALINGA, DOMINGUEZ, MARTINEZ, WILMINGTON

GULF COAST

HOUSTON, TEXAS; NORCO, LA.

MID-CONTINENT

EAST CHICAGO, IND.; WOOD RIVER, ILL.; ARKANSAS CITY, KANSAS

Wild well crew: Ralph Hall, Charles Kiefer, Art Trout, Pink Robinson, "Happy" Yowell, and Charles Butler.

much too far west for possible production but Jergins and Charlie Cotton thought otherwise. A contract was given to Tom Bailes, who, with only ten feet open below the shoe, brought in the first well for several thousand barrels.

This encouraged drilling farther to the west and Tuck Eden obtained production to the south and west. E J.. Miley also drilled in this area, and later the Hub Oil Co., headed by E. J. Wallis, drilled several wells. The Western Star Oil Company, headed by Lloyd Williamson, obtained production in several wells located west of Cherry Ave. Lloyd and Burns drilled these wells under contract.

When wells drilled in the Lovelady Pool on the southwest slope of the hill, south of Willow St. and between Walnut and Orange, came in for large production, many of the following came into prominence: Marine Oil Company, headed by James McKinney, supervised by Ed. McAdams; Davis & McMillan; Hugh Evans; Walter Fisher; Bob Cook, Sr. and Jr.; Jack Keck, Lou Hilton, Dabney Oil Syndicate with Art Delaney in charge, assisted by Butch McWherter; Sheridan Bailes; Bolsa Chica Oil Corporation, Irving Augur, president; Apex Oil Company with Vern Dumas; Geo. F. Getty with Carl Crossen as superintendent; Foster Bros. supervised by Harry Failing and Havenstrite

You haven't seen anything until you looked down this road on Signal Hill.

Signal Hill is going modern with steel derricks going up here and there. The Hill is busy, these days.

and Baker, drilling contractors. Union Oil Co.'s operations were directed from the Santa Fe Springs office by Geo. Kammerer. Jim Kammerdiner, famous for his invention of rotary jars, was in charge at Signal Hill with "Shorty" Brayton and Jack Davis as tool pushers. R. R. Templeton was placed in charge of geology and petroleum engineering and Cy Rubel became engineer at Signal Hill.

"High Pockets" Richardson and his brother, "Little Pockets," were well known as production men, the former acquiring per cents in wells scattered from one end of the field to the other.

The United Oil Company with Jerry Kent and C. F. Whittier at the head, supervised by Charles McGee and Baldy Gates, had obtained substantial production from wells on the Denni lease located near the top of the hill, and now started operations on the Hass lease situated south of Willow and east of Orange. This lease probably stands today at the top of the list in barrels produced per acre.

About this time Martin Van Couvering decided to leave the State Mining Bureau and opened an office at Signal Hill, assisting him was Chet Fear who later became associated with William Tizzard in The State Company. Tests for water shut-offs and mudding operations were witnessed for the State Mining Bureau, now the State Division of Oil and Gas, by Bob Keyes now superintendent for The Texas Company, Bruce Barkis, now with Lane-Wells Company and Art Graser.

A group of young men, called "scouts", met each week to exchange information and prepare a progress re-

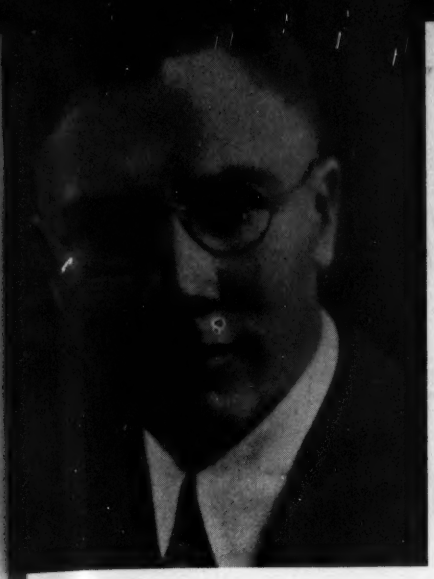
(Continued on Page 38)

1938

1921

You can drive among oil wells nearly anywhere in the Long Beach district, but when you get to Signal Hill you will understand why it was the wonder field.

After Alamitos No. 1, the rig builders had an era of plenty in which a veritable forest of derricks spread over the hill.



Lyman Scheel

Lyman Scheel, chairman of the program committee of the California Natural Gasoline Association, received his mechanical engineering degree at the University of Nebraska in 1925. Before that he did some work at San Diego State and California Institute of Technology. Shortly thereafter he entered the gas department of the Union Oil Company where he has been employed as mechanical engineer for about twelve years. Mr. Scheel has served the past three years as chairman of C. N. G. A. gas engine and compressor committee and has been active in assisting in arranging programs for the Association's monthly meetings. He is married, has two children and his hobby is amateur movies.

Pres. H. R. Linhoff, Richfield Oil Corp. **V.-Pres. P. S. Magruder, General Petroleum Corp.** **Sec.-Treas. George L. Tyler, 510 W. 6th, L.A.**

DIRECTORS

*** Executive Committee Member**

L. L. Aubert
Bankline-Norwalk Co.
B. D. Balthis
Natural Gas Equipment Co.
A. H. Bell
Continental Oil Co.
A. H. Bradford
West Coast Refining Co.
*J. C. Burks
O. C. Field Gasoline Corp.
*J. A. Campbell
Lomita Gasoline Corp.
L. V. Cassaday
Lomita Gasoline Corp.
F. E. Coyle
Associated Oil Co.
F. E. Davie
Shell Oil Co.
Earle Derby
Standard Oil Co.
*H. L. Eggleston
Gilmore Oil Co.
O. C. Field
O. C. Field Gasoline Corp.
*P. E. Fluor
Fluor Corp.
J. P. Gasser
Seaboard Corp. of Dela.
*R. D. Gibbs
Union Cil Co.
*J. C. Gilbert
Barnsdall Oil Co.
R. H. Green
Signal Oil Co.
A. S. Hayes
Bell & Loffland, Inc.
*R. W. Heath
Signal Oil & Gas Co.
J. R. Hoffman
Smith-Booth-Usher Co.
*W. A. Kirk
California Southern Oil Co.
*B. A. Koehler
Pacific Western Oil Co.
W. H. Kraft
Honolulu Oil Corp.
*E. J. Lange
Associated Oil Co.
*H. R. Linhoff
Richfield Oil Corp.
A. C. Lyles
KNDA
R. S. Lytle
Los Nietos Prod. & Refining Co.
S. F. Magor
Superior Oil Co.

July, 1938

This section, a regular monthly feature of the California Oil World, is devoted to the activities of the California Natural Gasoline Association. The California Oil World is the exclusive official publication of the California Natural Gasoline Association, so designated by vote of the Association Executive Committee in a meeting on August 19th, 1937.

DIRECTORS

*** Executive Committee Member**

*P. S. Magruder
General Petroleum Corp.
G. C. McLaren
Standard Oil Co.
*William Moeller, Jr.
Southern California Gas Co.
*H. E. Moulton
C. C. M. O. Co.
*N. H. Mull
The Texas Co.
John Roger
Ingersoll-Rand Co.
W. D. Roper
Western States Gasoline Corp.
A. E. Schiltz
Del Rey Oil & Gas Co.
T. K. M. Smith
Industrial Fuel Supply Co.
W. D. Smith
Wilshire Oil Co.
*T. L. Taggart
Standard Oil Co.
*R. E. Tulin
Shell Oil Co.
Henry N. Wade
Parkhill-Wade, Inc.
R. E. Wells
Richfield Oil Corp.
*R. C. Wheeler
General Petroleum Corp.
L. M. Windle
Richfield Oil Corp.
W. M. Young
The Texas Co.

Taft Chapter Chairman

E. J. Lyon
Standard

General Committee Chairmen

Programs: Lyman Scheel
Union Oil Co.
Entertainment: George Christen
Crosby Steam Gauge & Valve Co.
Membership: E. H. Adams
Merco-Nordstrom Valve Co.
Technical: C. D. Gard
Union Oil Co.
Publicity: Dick Sneddon
Union Oil Co.
Advisory: P. S. Magruder
General Petroleum Corp.
Finance & Budget: T. L. Taggart
Standard Oil Co.
Auditing: H. A. Barrett
O. C. Field Gasoline Corp.

PRESSURE MAINTENANCE MEANS

40% GREATER PETROLEUM RECOVERY!

Pressure maintenance has long since passed the experimental stage! It's values are no longer based on mere conjecture. They are based on solid fact! Reliable, independent authorities, basing their statements on existing records, establish the fact that pressure maintenance increases production up to 40% while, if instituted sufficiently early in the field's history, recovery is as high as 51%! And this increased production is secured at an amazingly low cost equal to about 5% of the value of the added petroleum recovered!

The mathematics of pressure maintenance are, therefore, simple. They indicate a return of about 8 for 1. In themselves such figures merit your attention, but, when it is considered that increased petroleum production is but the ***primary*** advantage of pressure maintenance, the subject demands your immediate inquiry!

To this primary advantage must be added the maximum possible natural gasoline production which is the direct result of recycling the gas from the producing zone through the gasoline plant and back to the zone with each cycle producing added gasoline plant income. Still another advantage is the conservation of natural gas throughout the entire production period, making it available for sale as fuel after petroleum production ceases.

As the fabricators of some of the country's most notable pressure maintenance installations, we offer you the cumulative results of our experience. Where the field is owned by a group of producing companies, we are prepared to assist in pointing the way toward profitable cooperation and, in all cases, we are prepared to engineer such plants, collaborating with your production engineers, as well as to erect a plant capable of meeting every requirement peculiar to your field.

★ ★ ★

NATURAL GASOLINE PLANTS

GAS DEHYDRATION UNITS WITH CALCIUM CHLORIDE, GLYCERINE or DIETHYLENE GLYCOL CYCLES

STABILIZATION PLANTS

★ ★ ★

BUTANE PRODUCTION PLANTS

BUTANE STORAGE AND HANDLING EQUIPMENT

DUST AND LIQUID SCRUBBERS

PARKHILL-WADE

973 NORTH MAIN STREET
LOS ANGELES CALIFORNIA

AFFILIATED WITH

THE STEARNS-ROGER MANUFACTURING CO.

1720 CALIFORNIA STREET • DENVER, COLO.

Water Conditioning By Evaporator Methods

Three Classes Of Distillation Systems Discussed

By L. L. Wakefield
Engineer, The Texas Company

Water is one of the simplest fluids with which we deal, yet the impurities always present in water as it is obtained from nature for use make serious problems in most industries for both chemist and engineer.

In the manufacture of textiles, paper, in cleaning, dyeing, laundrying, and in many other industries, water or rather the inorganic and organic impurities in water plays a very important part. Even in pure distilled water there is the probability of free oxygen which will form oxides in engine jackets, boilers and piping, and of free carbon dioxide which is corrosive at the point of condensation.

In this paper I confine myself to the conditioning of water for boiler feed water and engine jackets by distillation, or what is more commonly termed evaporation.

The purpose of a water conditioning system is the modification of the character of, or the elimination of the solids in the make-up water. Properly designed evaporators for providing distilled make-up water will keep the amount of total solids in the make-up water well below ½ of one grain per gallon, which is practically equivalent to elimination of solids even though the water fed to the evaporators has a concentration of 150 or 200 times this amount. However, I wish to make this point clear—I do not propose that evaporation is the optimum treatment for all boiler make-up waters.

Selection Factors

The desirability of an evaporator system or, in fact, any other system, depends upon the operating conditions, steam demands, quality of raw water supply, and heat and material balances in each plant. Variations in these factors make each particular application a separate and distinct problem requiring the most careful consideration of chemist, engineer and owner.

For some time after the introduction of the evaporator system the application of evaporators to central power stations received principal consideration. Later, industrial engineers, observing the progress in central station practice, became interested in the possibilities of evaporators to serve their make-up water needs for boilers in industrial plants.

Reduced Water Losses

Formerly, the high percentage of boiler feed make-up required in the typical industrial plant involved such a large investment for evaporators that it was usually difficult to justify their purchase. In recent years many improvements in the design of operating equipment have brought about reductions in water losses thus reducing the amount of make-up required and the practical and economical application of evaporators has extended to an increasing number of industrial plants.

There are many and varied evaporator installations but I believe we can divide these into three general classifications, as follows:

(a) Single-effect Evaporator.
(b) Multiple-effect Evaporator.
(c) Reducing Valve Evaporator.

Single-effect evaporator system is one in which one evaporator is used to supply the make-up water to the system, and is generally used where the make-up requirement is a small percentage of the total requirement. The evaporator system described in this paper, in use at Shiells Canyon, is a single-effect evaporator. About 0.9 pounds of steam is generated in the single-effect evaporator for each pound of steam supplied to the evaporator.

Multiple-effect evaporator system is one in which two or more evaporators are set up in series, and is generally used where the make-up requirements are large, varying up to 75%, and there are even instances of 100% make-up requirement.

The Santa Fe Railroad has a three-effect evaporator installation at Winslow, Arizona.

From 2.2 pounds to 2.5 pounds of pure distilled water can be obtained per pound of steam supplied to the first effect evaporator in a three effect installation. Steam from the boilers is supplied to tubes in first effect evaporator and, of course, all of condensate is returned to the boilers. Vapor from the first effect is the heating medium for the second effect and so on until the last effect and the vapor there is condensed in some type of condenser. All drains are collected as distilled water to be used for whatever purpose intended.

Reducing valve evaporators are one or more evaporators in parallel that generate steam at a reduced pressure; a part to be used for process work, and the remainder condensed as distilled water for make-up. The evaporator thereby serves as a reducing valve, frequently being installed in parallel with a reducing valve in the main steam line.

Steam Service

Central power stations often make use of reducing valve evaporators when supplying steam to other industrial plants. An example of such an installation was when a certain industrial plant was building their plant at Long Beach. Negotiations were carried on between them and the Edison Company to supply their steam requirements. However, this industrial plant decided to build their own power plant and the deal was not consummated. Edison Company would not have disturbed their high pressure steam cycle, but would have installed reducing valve evaporators to supply the industrial plant's requirements. The largest installation of this kind in the United States is at Wilmington, Delaware where the Deepwater Central Power Station supplies steam to Dupont's plant.

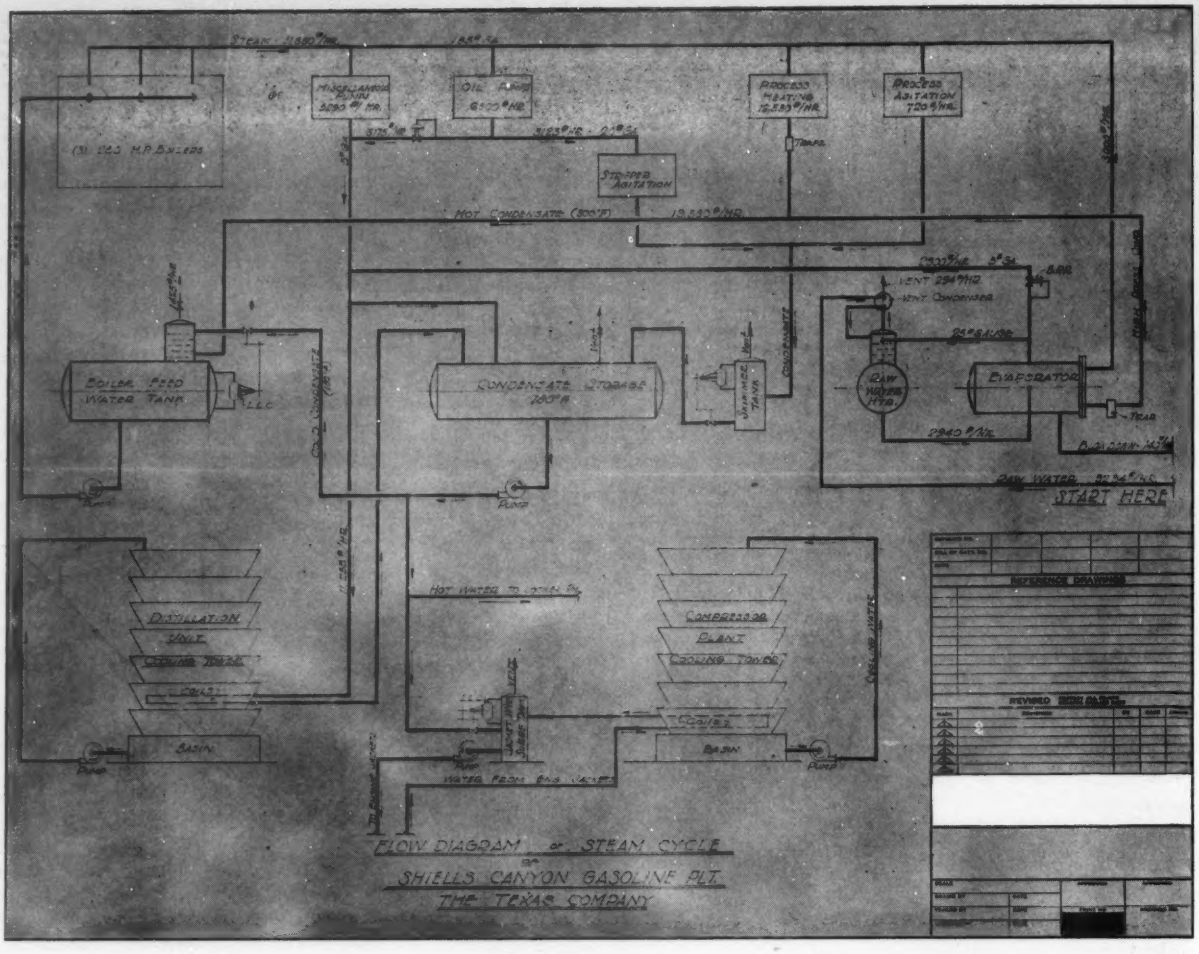
Hot Tar Evaporators

There is still another use for evaporators that is receiving quite some consideration among refiners, and this should be of interest to refinery engineers. It is what is called a hot tar evaporator, and finds use where cracking or viscosity breaking units are in operation. Where there is a residuum leaving the unit at from 500° F. to 750° F., and which has to be cooled down by some means before entering tankage, it can be put to work as a heating medium in an evaporator tube bundle much the same as high pressure steam, and, with raw water around the evaporator tubes, steam is generated up to about 785 pounds pressure gauge, and I believe one refinery in the East is making as much as 1000 H.P. of steam in this manner. The investment cost and operating cost are very nominal compared to a boiler installation.

Typical Problem

The evaporator system at The Texas Company gasoline plant at Shiells Canyon will serve to illustrate a typical problem of conditioning make-up water by evaporation.

A sample of the raw water used, which



comes from a water well located near the river bed at the mouth of Shiells Canyon, has the following analysis:

Ionic Analysis

	PPM	GPG
Silica, SiO_2	25	1.5
Iron Oxide & Alumina, R_2O_3	1	0.1
Aluminum, Al	1	0.1
Calcium, Ca	182	10.6
Magnesium, Mg	62	3.6
Sodium, Na	103	6.0
Bicarbonate, HCO_3	305	18.0
Sulphate, SO_4	586	34.2
Chloride, Cl	53	3.1
Total Solids, by summation	1321	11.7
Total Hardness, as $CaCO_3$	706	41.3
Total Alkalinity, as $CaCO_3$	504	29.5
pH Value	7.3	

Probable Combinations of Above Ions

Incrusting Solids:		
Silica	25	1.5
Iron Oxide & Alumina	1	0.1
Calcium Sulphate, $CaSO_4$	618	36.0
Magnesium Bicarbonate, $Mg(HCO_3)_2$	370	21.6
Magnesium Sulphate, $MgSO_4$	4	0.2
Total	1018	59.4
Non-Incrusting Solids:		
Sodium Sulphate, Na_2SO_4	217	12.7
Sodium Chloride, NaCl	86	5.0
	303	17.7

It will be noted that this water contains the usual carbonates, sulphates, chlorides of calcium, magnesium, and sodium, also some iron and silica.

The above analysis was submitted for consideration in several methods of water treatment. It is particularly important that an analysis of the raw water to be conditioned be submitted to a reputable evaporator manufacturing concern for recommendation as to crackability of scale which will be deposited on evaporator tubes by the raw water. With all these data obtained by chemists and the manufacturers of various water conditioning methods under consideration, the engineer worked out the economics for each, but the final decision did not rest solely with the engineer. We were traveling on unfamiliar ground insofar as the evaporator method was concerned in gasoline plant operation, so in order to avoid the pitfalls of others, we proceeded carefully, often consulting the chemists, operators and manufacturers. Finally, when the decision was made to use the evaporation method, we felt confident that the job was thoroughly engineered. We have made more than 20 different heat and material balances before the flow sheet, which is shown here, was finally adopted.

The evaporator system used at Shiells Canyon Gasoline Plant is shown on the flow chart herewith. Start with raw water to a deaerating raw water heater of the reservoir type. The raw water system throughout the plant has about 50 pounds to 60 pounds pressure at all times, so there is no difficulty in getting raw water into the raw water heater, which is held at 25 pounds pressure gauge. The pressure recommended for best hard scale formation in the evaporator was 25 pounds gauge. This is desirable for descaling. Steam for heating raw water to about 240° F. in the raw water heater is obtained directly from the evaporator. Oxygen and carbon dioxide liberated is vented to atmosphere through a vent condenser on top of the raw water heater and a portion of the non-incrusting solids, such as sodium sulphate and sodium chloride, are precipitated out on the trays and in

the reservoir of the raw water heater. The heated raw water flows by gravity to the evaporator, pressures being equalized through the steam line between evaporator and heater.

Heating Medium

The heating medium in the evaporator tubes is high pressure steam (185 pounds gauge) direct from boilers. Condensate from these tubes is discharged by trap into a hot condensate header. Heated raw water from the heater enters the evaporator shell around the tubes.

Raw water vaporizes in the evaporator much the same as in a boiler. The vapor or steam is maintained at 25 pounds gauge in this case. A portion of it, as mentioned above, goes to the raw water heater and the remainder goes to exhaust steam. Scale from raw water in the evaporator is deposited on the tubes where it is cracked off every 24 hours of operation. Every 8 hours of operation the evaporator is blown down. Of course, the above intervals would be governed by scale formation and concentration in evaporator water.

Every 60 days the hand hole covers are removed and the inside of evaporator washed down. The tube bundle has not been removed from the shell in over a year's operation. High pressure steam to evaporator tubes is controlled by a hand-operated flow control valve.

Let us dwell here for a moment on the similarity between a boiler and an evaporator. When either a boiler or an evaporator has raw water fed to it, scale is deposited on the tubes or in them, as the case may be. In an evaporator it is always on the outside of the tubes. When about 1/16 inch of scale is built up on evaporator tubes, the tubes are descaled in the following manner: Steam is shut off to tubes; evaporator is then emptied quickly through the 6-inch blow-down line; steam is opened full into tubes, expanding them to their maximum curvature; steam to tubes is again shut off; cold water is turned into evaporator completely submerging tube bundle and splash plate, thus contracting the tubes to their minimum, cracking off the scale; evaporator is again emptied through the 6-inch blow-down line; raw water is again turned into the evaporator, filling it to the proper level, and the operation starts another cycle. Whereas, when a boiler scales up, it has to be shut down, taken off the line, opened up, tubes rattled, washed out, closed up and put back on the line again. It is not as simple as opening and closing three different valves, as is the case with descaling an evaporator.

Now let us return to the flow sheet. Steam from the evaporator is released through a back pressure valve into the low pressure exhaust steam line (5 pounds gauge), and with exhaust steam from boiler feed pumps and circulating water pumps, is condensed in atmospheric condenser coils in the cooling tower.

Agitation Steam

Exhaust steam from the oil pumps at 20 pounds gauge is used for agitation steam in the Stripper. Steam condensate from Stripper agitation steam and Fractionator agitation steam is separated from absorption oil and gasoline and is returned to a 7000-gallon horizontal condensate storage tank. Condensate from the above mentioned atmospheric condenser coils is also returned to the 7000-gallon condensate storage tank. This storage tank is blanketed with exhaust steam for the twofold purpose of prevention of absorption of oxygen in the condensate from the air, and to maintain the temperature as near that of exhaust steam as possible. Condensate from here is pumped into the boiler feed water tank.

High pressure hot condensate, about 300° F., from all traps is returned to the boiler feed water tank. This tank is not only used for mixing hot and colder condensate but also functions as a final deaerator before the wholly distilled boiler feed water enters the boilers.

In the dome on top of the feed water tank are four trays. Cold condensate, about 180° F. to 190° F., enters the dome above the top tray. Hot condensate flashes into steam, along with any oxygen or carbon dioxide which might have been entrained in the hot condensate.

As these vapors flow up, countercurrent to the cold condensate flowing down, any traces of free oxygen or free carbon dioxide in the colder condensate is also liberated and, together with a small amount of steam, are vented to atmosphere. Water in the boiler feed water tank is from 230° F. to 260° F., depending upon the proportions of hot and cold condensate. A small quantity of chemical is fed into the boilers as a precautionary measure to inhibit possible caustic embrittlement. Every three months each boiler is taken off the line and washed out but not scaled, for in over a year's operation all three boilers are perfectly clean and devoid of scale.

Referring back to the exhaust steam condensers, these are in two parallel banks in the cooling tower. Raw water is used in the cooling tower, the same as is fed to evaporator, and is about 35 grains per gallon of hardness. A certain type of atmospheric condenser is used which is also the same descaling type as the tube construction in the evaporator. The exhaust steam condensers are descaled twice a week. Other condensors and coolers in the cooling tower are descaled at intervals according to need up to six months.

Make-up water amounts to about 5% of total feed to boilers.

Approximately 0.9 pounds steam is generated by the evaporator for each pound of high pressure steam fed to evaporator tube bundle.

Every 60 days two men require an 8-hour day to clean both the raw water heater and the evaporator. It was anticipated that the raw water heater would frequently have to be cleaned of soft scale. The boilers generate about 20,000 pounds of steam per hour.

In addition to boiler water make-up, water for make-up to engine jackets is supplied from the 7000-gallon condensate storage tank. Jacket water for the compressors at Shiells Canyon is in a closed system. Make-up water is fed into an open vented surge tank which undoubtedly allows oxygen to be absorbed in the jacket water at this point for the engine jackets have shown rust. This is now being inhibited by the use of a rust inhibitor.

Some of the features of the evaporator which received particular consideration are as follows:

(1) Interchangeability of all interior movable parts.

(2) Access to interior of the shell through manholes or large hand holes in both front and rear heads for inspection and cleaning.

(3) Heating elements removable without entering shell.

(4) Heating surface low in the shell to provide ample vapor space above the tube bundle.

(5) Largest possible disengaging surface.—It would not be considered good design if a five tube boiler were filled practically full of tubes.

(6) Descaling features.

(7) A moisture separator which performs the same function as the dry pipe in a fire tube boiler.

(8) A splash plate above the topmost tubes to prevent spouting of the water from violent ebullition.

Other successful evaporator installations have been made on the West Coast but mostly in power plants; a few, however, being in industrial plants.

Regardless of what your steam requirements may be, whether it is drilling operations, gasoline plant, refinery or any other industrial plant, the importance of water conditioning should not be overlooked. Snap judgment should not be made. The executive who has foresight enough to permit a thorough study of power requirements and water conditioning is laying the foundation for economical operation.

Water Treatment Highly Important Phase

Of Natural Gasoline Plant Operation

By W. W. Robinson
Chief Chemist, Producing Plant., Gasoline Division, The Texas Company (Calif.)

Developments in recent years have emphasized to the refiner and natural gasoline manufacturer that the proper treatment and control of boiler feed and cooling waters can pay big dividends in reduced operating and maintenance costs. Here on the Pacific Coast we often speak of how many millions of gallons of natural gasoline we make. I wonder how many of us have speculated on how much water we use daily, or monthly, in operating our boilers, cooling our engines, or in condensing our vapors. Let us pause for a moment and see if we can form a picture of the magnitude of the part water and water treatment plays in our manufacturing process.

Someone has estimated that 375 boilers represent the total number in use in the Pacific Coast's 94 gasoline plants. If we assume the average horsepower per boiler to be 150 and operating conditions to be 100% of rating we find that almost 5,600,000 gallons of water a day are required for boiler feed, or close to 168,000,000 gallons a month. If we assume an average hardness of 10 grains per gallon we arrive at a total of 120 tons as representing the amount of scale which this huge amount of water can contain. Based on the customary 10 square feet per horsepower, we find that the total surface which our 375 boilers expose to the varying properties of water is almost 13 acres.

This is only part of the picture. What about our cooling towers? With an estimated 185 cooling towers of assorted sizes and capacities in our 94 gasoline plants, and the assumption of an average pit dimension of 16 feet wide, 50 feet long and 2 feet deep; a circulation rate of 1200 gallons a minute; and a makeup requirement of 4%, we arrive at 1,340,000 gallons as representing the volume of water impounded in our 185 cooling towers. Based on the aforementioned circulation rate and a 4% makeup, the volume of makeup water, per month, reaches the total of nearly 384,000,000 gallons. Based on 10 grains per gallon, these two volumes of water can carry 275 tons of scale into our cooling systems.

Half a Billion Gallons

From these considerations we arrive at the generalized conclusion that our portion of the Pacific Coast's petroleum industry utilizes 552,000,000 gallons of water a month for steam generation and for cooling and that this huge amount of water can contain close to 395 tons of scale. With natural gasoline production averaging about 50,000,000 gallons a month, this means that we use 11,000,000 gallons of water for every 1,000,000 gallons of natural gasoline manufactured.

With an estimated $1,800,000 representing our investment in boiler shells, piping and pumps, and another $1,200,000 for cooling coils, circulating equipment and accessories, is it any wonder that we should be deeply interested in ways and means of protecting our $3,000,000 investment through the effective control of scale and corrosion?

Treating Systems

Without going into the details of water chemistry let us consider briefly some of the practical angles of water conditioning with the idea in mind of viewing this important field in perspective. Zeolite, lime and soda, evaporation, internal treatment, the use of colloids and, in the case of cooling tower waters, the added control of algae—all have avenues of application. First off, it is essential that we keep in mind that no one system is a complete solution to all treating problems, but that each water presents a special problem with the necessity for the treating method being tailored to fit.

When we consider zeolite softening we have in mind that the principle of the method is to exchange the sodium portion of the zeolite for the calcium and magnesium making up the hardness of the water. When the zeolite is exhausted we regenerate it with a common salt brine of approximately 10% strength, replacing the calcium and magnesium taken up by the zeolite with sodium from the brine, and using anywhere between 0.4 to 1.0 pound of salt for each 1000 grains of hardness removed.

We are further aware that there are two types of zeolites known as natural (non-porous) and synthetic (porous). The softening capacity of the natural form is between 2500 and 3000 grains per cubic foot, the synthetic form has a softening capacity of between 10,000 and 12,000 grains per cubic foot, and even though having a greater softening capacity can easily become clogged and is harder to regenerate. In certain alkaline waters of low hardness the natural zeolite is the best to use because of the destructive effect of alkalinity on the more sensitive synthetic form, and we must keep in mind that we should not use zeolite to soften hot waters, waters containing suspended matter (turbidity), free mineral acids, iron or manganese salts, or hydrogen sulphide.

Zeolite Advantages

Among the advantages we can expect to gain through the use of zeolite are compactness, cleanliness, no need for sludge disposal, semi-automatic or full automatic operation with little supervision, the realization of a soft water whose residual hardness is not more than 1 grain per gallon, a negligible pressure drop when used on main supply lines, no repumping of soft water, and efficient operation on waters of fluctuating hardness.

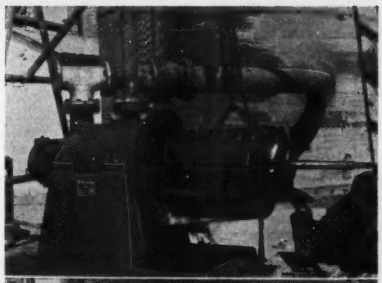
The disadvantages which we must keep in mind are an increase in the total solids of our water, the passage of colloidal silica, the necessity (in certain cases) for excessive blowdown, the formation of decomposible bicarbonate of soda and the generation of caustic alkalinity, brine disposal, and the increased investment and operating costs when softening waters whose hardness is over 30 grains per gallon. Deaeration must be carried out separately.

Lime and Soda

When we think of softening water by the lime and soda method we have in mind that the principle of the treatment is to add milk of lime (calcium hydroxide) to precipitate bicarbonate (temporary) hardness as a sludge, and soda ash (sodium bicarbonate) to precipitate permanent (sulphate) hardness also as a sludge. The treatment is carried out as a batch process in one or more tanks equipped with a means of agitating the chemicals when introduced and for collecting the sludge which settles. Chemicals known as coagulating agents are sometimes added to speed up the settling rate and carry down fine particles which would pass through the filter. The water from the treater is then run through a sand filter. We know further that we have the choice of softening water which is cold, or water which has been heated, and that there are substantial economies and advantages to be gained by hot processing.

OFF COMES *the* COVER

Inner Volute Case and Rotating Element being removed as a single unit. Note weight being carried on the Dismantling Tray.



Upper half of Inner Volute Case lifted preparatory to removal of completely assembled Rotating Element.

Rotating Element being lifted clear of pump. Spare Rotating Element is simply dropped into position and the pump re-assembled.

BYRON JACKSON DOUBLE-CASE HOT OIL CHARGING PUMP

. . . with simple minor bearing parts removed, and End Cover with Bearing Housing being removed. No Piping has been disturbed and the Driver has not been disconnected or disturbed. The Dismantling Tray in foreground will be found in position in illustrations below.

These pumps have gained the favor of operators because they can be so easily dismantled and reassembled in the field, without disturbing piping or drivers, and with no necessity for field work upon the Rotating Element.

Engineers approve them because of the simple design which provides almost perfect hydraulic balance without using any so-called balancing devices that inevitably wear and cease to function, thus throwing heavy loads upon the thrust bearings.

Complete information is available upon request.

BYRON JACKSON CO.

Dept. 0-28

***Factories at:* Berkeley and Los Angeles, California**
Bethlehem, Pennsylvania

Sales offices: New York, Pittsburgh, Fort Worth, Chicago, Atlanta, Houston

Established 1872

BYRON JACKSON

CENTRIFUGAL PUMPS FOR EVERY SERVICE

The advantages we know to be possible through this type of treatment (hot or cold) are reflected in a material reduction in the total solids content of our water, the ability to treat waters of very high hardness, less blowdown, with careful control a lower alkalinity, less tendency to foam, the removal of half-bound and free carbon dioxide, the elimination of silica, the reduction of small amount of hydrogen sulphide, a reduction in bicarbonates which can minimize the growth of algae in cooling towers, and, in the case of hot processing, the venting of most of the dissolved oxygen.

Cold and Hot Processing

In choosing between cold and hot processing, where conditions justify, we know that hot processing is superior because the chemical reactions are faster, the sludge settles more rapidly, there is a more complete removal of hardness, the system is a combination softener, deaerator and feedwater heater all in one, and the equipment required is smaller.

Among the disadvantages of either hot or cold processing which we must keep in mind are that the system does not automatically handle fluctuations in hardness without special control, in general requires chemical control and frequent adjustment of dosages, the repumping of the soft water is usually necessary, the use of coagulants frequently raises the operating cost, there is a higher residual hardness which often necessitates after-treatment in the boiler or cooling tower, and the annoyance of sludge disposal has to be met.

When we consider the internal treatment of boiler water we have in mind that we wili use the boiler shell itself to produce reactions which will yield a soft non-scaling sludge which can be eliminated through blow-down. We must remember that we will allow the temporary hardness (calcium and magnesium carbonate) to break up without the use of chemicals to form insoluble calcium carbonate and soluble magnesium carbonate and liberate carbon dioxide gas which passes off with the steam. We know further that as the magnesium carbonate concentration increases to supersaturation, due to the concentration of the boiler water, that some of it will settle out with the calcium carbonate and that there two carbonates will not form a scale unless permanent or sulphate hardness is present. Without sulphate present to cement the carbonate sludge, the carbonate sludge can be eliminated through blowdown.

Sulphate Hardness

If water we wish to treat internally contains sulphate hardness we then resort to the introduction of soda ash (sodium carbonate) to precipitate the sulphate. In doing so we are careful to introduce a slight excess of soda ash so that a portion of it will hydrolize to caustic soda, which in turn will react with any magnesium carbonate and precipitate insoluble magnesium hydroxide. A slight further excess of alkalinity will be helpful in minimizing corrosion. Moreover, the supplementary use of sodium aluminate assists the treatment by contributing a reactible compound which forms a soft, heat-resisting floc which agglomerates and stabilizes the fine precipitates formed by the aforementioned reactions and contributes much to the even boiling of the water and the prevention of impaction of the sludge.

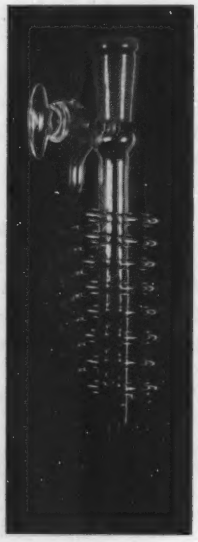
Among the advantages of internal treatment we have low installation cost, very little external equipment in most cases, the removal of silica, the maintenance of good sulphate and carbonate relationships, the control of alkalinity, the presence of a floc which not only promotes even boiling but in many cases permits higher steaming rates, and a satisfactory control of scale formation.

Among the disadvantages we have the problems which arise through the incrustation of feedwater heaters and lines between the heater and the boiler. As soon as waters containing bicar-

SCIENTIFIC GLASS APPARATUS . . .

made promptly to your specifications at reasonable prices. Specially designed tools and equipment insure efficiency and precision.

We also do expert repairing on all kinds of laboratory glassware.



GREINER
Glassblowing
LABORATORY
251 W. Santa Barbara Avenue -:- -:- Los Angeles, California
ADams 12168

Just Say---

YES! You may send me the CALIFORNIA OIL WORLD for one year, for which I enclose $1.00.

For Foreign Countries, $2.00

Name _____

Address _____

City _____ State _____

Position _____ Company _____

Check branch engaged in Producing..... Refining..... Natural Gasoline.....
Marketing..... Manufacturing.....

Subscriptions accepted only from persons actively connected with the oil industry.

California Oil World, 714 W. Olympic Blvd., Los Angeles

bonates are heated the breakup commences and care must be exercised to prevent incrustation of external equipment. Further, internal treatment requires chemical control and adjustment of dosage, sludge disposal in certain cases, and, in the case of very hard waters a means of continuous sludge deconcentration over and above that gained through continuous blowdown if all of the reactions are produced within the boiler.

Colloidal Materials

In the comments on this type of treatment it is well to remember that in cases where waters are encountered whose hardness precludes internal treatment the major part of the treatment can be carried out externally with the lime and soda reaction, permitting a partially softened and partially clarified water with a residual hardness of around 5 grains per gallon to enter the boilers. The residual hardness can then be controlled by the combined action of an after-treatment made up of phosphate and colloidal material.

This brings us to the brief consideration of water treatment with colloidal materials. Generally speaking, when we think of such materials we have in mind tannic acid compounds, various glucosides, plant extracts, seaweed derivatives, and other complex organic substances which, because of their amorphous colloidal natures can often prevent the intercrystalline growths or cementing actions which cause the formation of scale. Some organic compounds have reactible elements which can bring about the substitution of sodium for calcium and magnesium and render the new calcium and magnesium combinations in a form which is non-scaling. Low bicarbonate waters free from sulphate often respond well to the combination treatment with organic colloidal material and phosphate.

In thinking of colloidal treatment we have in mind that it can be applied to control the residual scale sometimes encountered in waters softened by zeolite, lime and soda, and in some cases in evaporated water. We know that the application of colloidal treatment by reputable concerns to conditions where a careful analysis indicates benefits to be possible is practical and scientific. Moreover, the day is rapidly passing when we encounter colloid compounds of unknown quality because most of the well-known concerns are willing to reveal the fundamental chemistry on which the behavior of their particular brand of colloids is based. We must still be on our guard against the "cure-all" boiler colloid.

Cooling Tower Water

Our consideration thus far has kept the treatment of boiler water prominent. Now let us review what interests us in a cooling tower water. Zeolite waters and lime-soda waters are excellent and in viewing the question of cooling it is important to remember that many of the conditions in the cooling tower resemble those in the boiler with the exception that the temperatures are much lower. For example, in the boiler the solids in the water are concentrated due to the evaporation of the water in the generation of steam. Analogously, in the cooling tower the pit water is concentrated due to the evaporation of water during circulation and cooling. Therefore, we should keep an eye on the concentration of the solids in our cooling tower pits and not let these solids rise to a value greater than 500 grains per gallon and at the same time bear in mind that a concentration, where economy of operation permits, of 250 grains per gallon is even better.

Any residual scale in cooling water will invariably find its way onto the coils, or into the engine heads. Frequently in the case of engine heads we find that the high temperatures generated during operation promote the formation of an extremely hard scale even in waters with a residual hardness as low as 2 grains per gallon where silica is also present. In water treated with lime and soda, very small residual quantities of sulphate can cause a lot of trouble. In instances such as these the use of colloidal material alone, or in combination with small amounts of phosphate has, in certain instances, produced beneficial results. However, it is well to keep in mind that the proper control of cooling tower waters is a question still in its infancy and much remains to be learned. On the other hand there is much which can be done and which will pay dividends in reduced coil and engine head scaling, as well as in reduced corrosion.

Algae

No comments on cooling tower waters are complete without mention of our annoying and unwelcome perennial visitors—algae. A few years ago most of us thought that algae was an Englishman's first name but we now know them to be water plants which can grow to form scums and gelatinous masses which can seriously interfere with the even distribution of water in the tower and make costly desliming jobs necessary.

A few fundamental things about algae which it is well to keep in mind are that they are water plants and most of the forms which bother us out here have to have sunlight and carbon dioxide with which to catalytically make the glucose with which they feed themselves. The source of carbon dioxide is that dissolved in water or the carbon dioxide contained in bicarbonate hardness, many not realizing that these water plants can utilize half-bound CO_2. Many of us incorrectly speak of cooling tower slimes as fungi. Fungi are plants the same as are algae but they differ in that they are usually found near decaying vegetable matter, contain no chlorophyll, and are illustrated by such types as molds, mushrooms, etc. On the other hand, most algae need sunlight, contain chlorophyll, live in water, and are represented by such types as pond weeds, sea weeds, etc.

In the control of these growths, a reduction in the amount of bicarbonate in the water and the exclusion of sunlight will do much to minimize them. Unfortunately, in our business we cannot always carry out such procedures. However, we do note that during winter and in cloudy summer periods that algae are not as severe as when bright sunlight and warmth characterize the general run of weather. Summer is usually the worst time for these conditions.

With most of us the circumstances are simply that of trying to keep the growths partially or completely under control in spite of the sunlight, or other factors favoring them. This is generally done by a combination of chemical treatment and occasional desliming by mechanical means. As an illustration of chemical control we have the application of permanganate of potash in fairly high concentration to produce a rapid kill, followed by mechanical desliming with brooms, shovels, and, in some cases, through special pump hook-ups to permit sucking up the slime which falls into the pit. Other chemicals frequently used are copper sulphate (blue vitriol), chlorine, chlorinated lime, chloramines, cresols with high phenol coefficients, zinc chloride, arsenicals and dyes.

Algicides

Unfortunately, there are but few operators who can claim completely satisfactory control through the application of algicides. As a general rule, copper sulphate has not been as successful as we would like it to be in that after the first kill there seems to be a rapid development of a tolerance of future doses. Chlorine tolerance is also noted by many, and includes all of the chlorine compounds. The cresols are effective but still high in price, while the arsenicals and dyes still have to be proven.

Still other chemicals will come into use as the problem is studied.

Many of us note that cooling towers which have spray nozzles instead of troughs and an internal construction so that the water fall is well broken up without creating pools of quiet water are freer of growths. In recent years the general trend in control has been

(*Continued on page* 34)

(*Continued from page 33*)

periodically to deslime a cooling tower and then rely on what effect can be gained from an inexpensive algicide. In such a manner the period between desliming operations can usually be extended to once or twice a year. In algae control, as well as in scale control, much can be gained by endeavoring to utilize the present state of our knowledge, incomplete though it may be. A partial solution is better than none at all.

Conclusion

In conclusion it is well to leave the thought that in water treatment, the same as with any other phase of natural gasoline manufacture, a compromise is necessary between the pure chemistry of water treating and practical factors such as cost of installation and operating and maintenance costs. A composite judgment is necessary in determining the overall effect desired so that emphasis may be placed on the factors of prime importance to each individual case because water is like people—no two are exactly alike.

Decreased 360 from the April figure, California oil industry employment in May reached a total of 50,820, according to an estimate of the California Oil and Gas Association.

R. F. Schroeder

Shell Announces Seven Promotions

Seven major promotions in the marketing department of Shell Oil Co. were announced last week by L. G. McLaren, vice-president in charge of marketing. R. F. Schroeder, former assistant general sales manager, succeeds McLaren as general sales manager; P. J. Pieroth, from head office sales representative to assistant manager of the operations department; E. C. Harrison, from head office sales representative to assistant general sales manager; E. R. Raphael, former head office sales representative to Oakland division manager; R. D. Statson, from Los Angeles division manager to manager of the service station department; R. B. Jensen, retail merchandising manager to Los Angeles division manager; and J. A. Pell, former Oakland division manager, to Eastern representative with headquarters in New York.

New Greeley Canal Prices

Effective 7 a.m. July 9th Standard Oil Co. of California announces the adjusting of prices it offers for crude oil in the Greeley and Canal fields (Kern County).

Increases range from 7 cents per bbl. for 27-27.9 gravity, to 4 cents for 48-48.9 gravity and above. The new prices range from 91 cents for 27 gravity to $1.68 for 48 gravity and above.

This adjustment is occasioned by a change in the quality of the crude produced since the establishment of the original offering prices.

Here is new schedule for Greeley and Canal fields.

Effective July 9th, 1938—7:00 a.m.:

Gravity in Degrees	
27-27.9	$ .91
28-28.9	.94
29-29.9	.98
30-30.9	1.02
31-31.9	1.06
32-32.9	1.09
33-33.9	1.13
34-34.9	1.17
35-35.9	1.20
36-36.9	1.24
37-37.9	1.28
38-38.9	1.31
39-39.9	1.35
40-40.9	1.39
41-41.9	1.48
42-42.9	1.46
43-43.9	1.50
44-44.9	1.54
45-45.9	1.57
46-46.9	1.61
47-47.9	1.65
48-48.9	1.68

Martin-Decker Corp. is entertaining its employes and their families at a barbecue on the A. F. McQuiston farm, near Bakersfield, July 23.

Makes Field Boilers Work Better!

1. Eliminates trouble with scale—corrosion—and carryover.

2. Permits continuous and uninterrupted boiler operation.

3. Permits immediate transfer of equipment to new locations—ready to go.

4. Permits maintenance of higher pressures and ratings.

5. Cuts maintenance costs. Saves fuel.

•

Write for full particulars

NATIONAL ALUMINATE CORPORATION

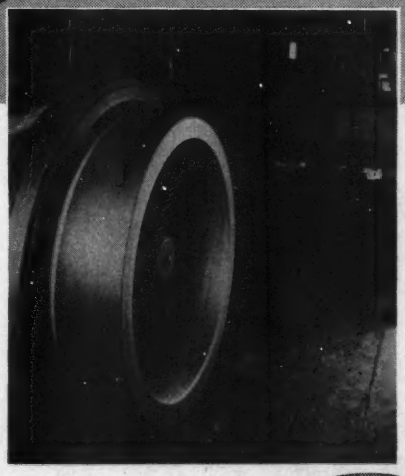
6223 W. 66th Place · Chicago, Ill.

For quick service, telephone NOrmandie 4694, or write: 2870 Avenel Ave., Los Angeles, Calif.

NALCO SYSTEM OF FEED-WATER TREATMENT

The long, useful life of an electric motor for oil-well pumping makes your life a merry one, for electric motors give more than just years of operation—they give years of **carefree** operation. Electrical pumping practically eliminates the expense of repairs and production losses due to shutdowns.

Add years to your own pumping equipment by installing electric motors on your wells. An Edison engineer will be glad to show you why hundreds of electric motor installations have been giving constant service for 8 to 10 years, with little or no repair expense. Just call your Edison office.



A. N. Macrate Well, Signal Hill, equipped with 20 horsepower motor that has been in constant service since 1928!

ELECTRICITY *at work in the oil fields*

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

7-38

LAUGH THIS OFF

There may be no truth in the story, but we have been told that back in a certain Texas town in the old days they had a law that forbade any man to drink whiskey unless he had been bitten by a snake. They only had one snake in town, and the daily line-up of oil men waiting to be bitten was so long that the snake usually became exhausted in the early afternoon and refused to bite any more customers.

And says **Doc Emmons**, "He was a trusted and tried employee. They trusted him too long and he was tried yesterday."

"I'll give you three days to pay your board," said the boarding house landlady, and the rousty replied, "Okay, let's make it All Fools' Day, July 4, and Christmas."

Vivian Washbon now tells us that the pastor of a local church preached a sermon from St. Paul last Sunday, and two lads from Minneapolis walked out on him.

It was Vivian, you know, who completely upset the story that Adam was the first man, and proved that the first man to be mentioned in the Bible is Chap. I.

Frank Coyle, on the other hand, opines that it may be bad manners to dip your bread in the gravy, but at least it's good taste.

And **Jim Reed** declares that one of the most conscientious individuals he ever knew was a Santa Fe Springs oil man who chased a sprinkling cart two miles just to tell the driver it was leaking.

Neighbors, according to **Bill Ackerman**, the San Francisco sage, are people who are always wondering when the heck the party is going to end.

And **Bill Saul**, his compatriot, declares there is nothing like a lawn party for bringing a bunch of rakes together.

Cash Belden remarks the peculiar fact that politicians commonly suffer from exposure even in the most clement weather.

Cash, you may remember as the lad who brought out to the west from his Alma Mammy—M.I.T.—that world famous jingle:

"I come from good old Boston
The home of the bean and the cod
Where Cabots speak only to Lowells
And Lowells speak only to God."

Jim Craig has decided that he will go to the San Francisco Exposition after all, but just in case it should prove kinda dull is taking a deck of cards with him.

Now comes **Bill Fearon** bringing sad tidings from the East. Bill says the crops are so poor in certain parts of Iowa that one farmer ate up 14 acres of corn at a meal.

Bill, by the way, was the first individual ever to photograph a razor-back hog stropping himself against a tree.

And it is an actual fact that many farmers have taken to raising hogs in preference to grains, because the former don't need to be hoed.

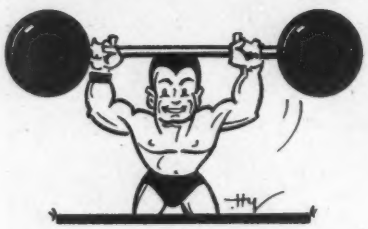
George Thompson writes to inform us that a Kettleman Hills Scotchman, who shall be nameless, was rescued by a plant operator recently when he fell into an oil tank. After it was all over, he told his rescuer, "You're a brave laddie, an' I'm certainly goin' to reward ye. Have ye change for a quarter?"

"In what direction does the village be?" asked the tourist who wanted to go to a certain beach village. "Well," said the questionee, "It lies in lotsa directions, but mostly about oil wells."

With which few remarks we again leave you to your own devices. Remember, a camel may not be able to go through the eye of a needle, but a good sized woman can go through your pants' pockets.

And it's better to play against a bad loser than a good winner.

STRENGTH



. . . MORE THAN YOU WILL EVER NEED . . .

SAFE FOR GUIDING, FLOATING AND CEMENTING THE LONGEST AND HEAVIEST STRINGS OF CASING.

BAKER

Cement Guiding, Floating, Cementing Equipment

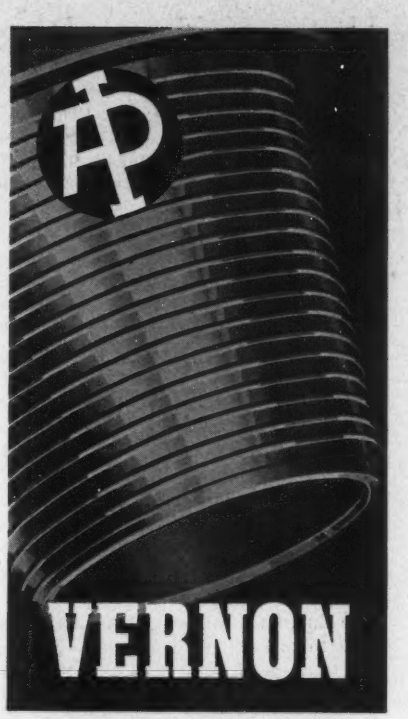
BAKER OIL TOOLS, INC.

Telephone Jefferson 0211 – HUNTINGTON PARK, CALIFORNIA – 2989 E. Slauson Ave.
Telephone Wayside 2106 – HOUSTON PLANT AND OFFICE – 4825 Navigation Blvd.
MID-CONTINENT OFFICE AND WAREHOUSE:
Telephone 24888 – Tulsa, Oklahoma – 315 East Fourth Street
WEST TEXAS BRANCH OFFICE – Edison Street – Telephone 217 – DEPOT SALE OFFICE – Rm. 1914 – 70 Pine St. New York City – Tel. Digby 4-3915 – ROCKY MOUNTAIN HEADQUARTERS – Tel. 2550 Casper, Wyoming – Box 1424

State Drilling Report

Field	Company	Well	No.	Sec.	Twp.	Range
		NEW WELLS				
Rosecrans	F. E. Fairfield	Abel	1	19	3S	13W
	Barnsdall Oil Co.	Trust	5	18	3S	13W
	Union Oil Co.	Rosecrans	22	18	3S	13W
			23	19	3S	13W
Rincon	Continental Oil Co.	Grubb	9	24	3N	24W
Ventura	Ventura Drilling Co.		1	10	3N	23W
Richfield	Shell Oil Co.	Swain	1	28	3S	9W
Santa Maria Valley	Union Oil Co.	Mallory	2	27	10N	34W
Wilmington	O'Kane & Brain, Inc.		O-1 & O-2	2	5S	13W
	Macson Oil Co.		G-55-2	32	4S	13W
	Selegna Drlg. & Prod. Co.		17	32	4S	13W
	Union Pacific Railroad Co.	Union Pacific	90	3	5S	13W
			91	4	5S	13W
Imperial County	Max Cawthon	Max Cawthon	1	13	11S	13E
El Segundo	Sovereign Oil Corp.	Sovereign Copinger	1	12	3S	15W
Torrance	Packard Petroleum Corp.		3	22	4S	14W
	Silver Strand Oil Co.		1	22	4S	14W
	Coast Line Oil Co.	Barto	2	23	4S	14W
	MacDonald & Burns	Moore	9	23	4S	14W
	Jones Long Oil Co.	Von Trik Lyon	1	23	4S	14W
	Lomita Drilling Co.		2	22	4S	14W
	The Texas Co.	Wilson Comm.	12	22	4S	14W
Montebello	Union Oil Co.	Wilcox	2	2	2S	12W
Cat Canyon	Barnsdall Oil Co.	Magenheimer	5	9	8N	32W
	The Petrol Corp.	Magenheimer	511	9	8N	32W
Monterey County	The Texas Co.		1	10	21S	10E
Midway	C. A. Magnuson		2-A	19	31S	23E
	Midway Peerless Oil Co.		17	15	31S	22E
Belridge	Shell Oil Co.	Voigt	4	32	27S	20E
Lost Hills	Tidewater Assoc. Oil Co.	Williamson	11-A	11	26S	20E
Sunset	Mary B. Cates, Special		8	2	11N	24W
Round Mountain	Honolulu Oil Copr.		48	20	28S	29E
	Crestmont Oil Co.	Staley	4	8	28S	29E
	Shell Oil Co.	Olcese Estate One	3	16	28S	29E
Kern River	The Hast Oil Co.	Kern	4	34	28S	28E
Coalinga	The Superior Oil Co.	Hight	1	8	20S	16E
	The Texas Co.		19	12	20S	15E
	F. C. Goetz	Medford	1	10	20S	15E
	Tidewater Assoc. Oil Co.	Guardian	33	12	20S	15E
	Franklin C. Grimes		88	12	20S	15E
	Petroleum Securities Co.		7	7	20S	16E
Fruitvale	Meridian Oil Co.	Fee	r	23	29S	27E
Mt. Poso	Crestmont Oil Co.	Durnal	1	24	27S	28E
		DEEPEN OR REDRILL				
Torrance	Kiesau & Ford	Rhoads	1	23	4S	14W
	Woolner Oil Corp., Ltd.		4	15	4S	14W
	Calridge Oil Co.	Meyer	1	23	4S	14W
	Standard Oil Co.	Marble 1	12	22	4S	14W
	Rico Oil and Gas Corp.	Victoria	1	23	4S	14W
	C. C. M. O. Co.	Torrance	16	14	4S	14W
Playa Del Rey	Calif. Production Co.		2	21	2S	15W
	Fiske & Curtis	Morrison	1	21	2S	15W
Santa Fe Springs	Standard Oil Co.	Hepler	7	31	2S	11W
		Santa Gertrudes	12	31	2S	11W
		So. Whittier Comm.	23, 24 & 27	5	3S	11W
Seal Beach	The Texas Co.	Alamitos	3	3	5S	12W
Midway	Mascot Oil Co.		3	36	32S	23E
	Vanguard Oil Co.	Heavilin	1	34	32S	24E
Long Beach	The Texas Co.	Foster Two	3	19	4S	12W
	Italo Petroleum Corp.	Kading	2	24	4S	13W
Wilmington	Crail Bros., Inc., Ltd.	McAllister	1	33	4S	13W
Elwood	Bankline Oil Co.		89-6	15	4N	19W
Belridge	Belridge Oil Co.		53-26	26	27S	20E
Sunset	Obispo Oil Co.		12	32	12N	23W
	Standard Oil Co.	M. J. M. & M.	64	36	12N	24W
Mt. Poso	Sunset Oil Co.	Sunset 3	1	3	27S	28E
	Union Oil Co.	S. & M.	5	4	27S	28E
Kern River	Italo Petroleum Corp.	Cauley	34	16	28S	27E
Mountain View	Mohawk Petroleum Corp.	Hood	5	30	30S	29E
	Union Oil Co.	Wible	2	23	30S	28E
		ABANDON				
Santa Paula	Wheeler Canyon Oil Co.		18	23	4N	22W
Midway	The Texas Co.		17	32	32S	24E
			5 & 7	24	31S	23E
Kern County	Amerada Petroleum Corp.		5	22	26S	19E
Kern River	Alfred Fuhrmann		25	21	28S	28E
Rosecrans	J. M. Ackerman	McBride	1	7	3S	13W
Coyote Hills	Kelmar Oil Co.	Kelmar	1	16	3S	9W
Los Angeles County	R. S. Ballantyne	Lindsey	1	1	5N	12W
Long Beach	Sunshine Oil Co.	Noll	4	29	4S	12W
Elwood	Barnsdall Oil Co.		88-8	16	4N	29W
Midway	North American Oil Cons.		6	2	32S	23E
Kern County	Petrex, Inc.	Petrex	1	32	31S	30E

Summary	Week Ending July 16	Previous Week	To Date This Year	To Date Last Year
Total New Wells	22	22	647	839
Total Deepened or Redrilled	11	17	451	387
Total Abandoned	7	6	252	268



TOOL JOINTS

provide greatest endurance and satisfaction on the job!

The threads on VERNON A. P. I. Tool Joints are *absolutely true* because they are cut *after* the Joints are hardened. This prevents warping out-of-round and assures longer service. The use of finest steel and the application of scientific heat treatment provide uniformity, proper hardness and super strength for the most satisfactory results in the field.

Available in Full Hole, Standard and Pittsburgh Special Types.

NO FINER TOOL JOINTS CAN BE MADE!

Take the guess work out of pipe make-up by having us machine-screw Tool Joints onto your Drill Pipe. When VERNON makes up your string, you are sure to get maximum service. You are invited to visit our plant and see how!

VERNON TOOL CO., LTD.
2740 EAST 37th STREET, LOS ANGELES

History of Long Beach Field Development, Continued

(Continued from Page 24)

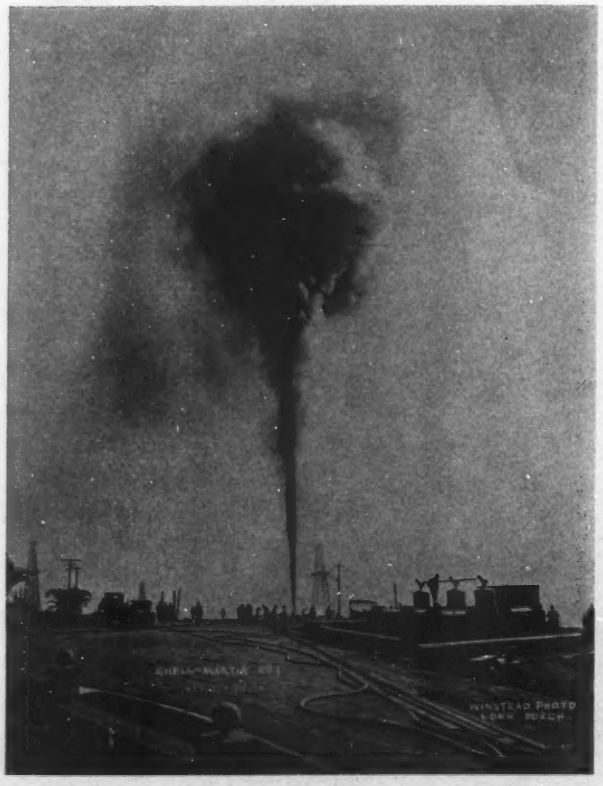
port of developments for the entire field. Much of this information was difficult to obtain as many operators were loath to tell their neighbors about shut-off points and total depths. Among others were Roy Mead, Steve Dunlap, Bill Comstock and Bill Harrod.

Several disastrous blow-outs occurred in the early history of the field, with wells on the Nesa, Martin, Wilbur, Andrews and Ryder leases getting out of control. "Happy" Yowell was called upon to cap these wild wells—the accomplishments of "Hap" and his crew still stand out as examples of courage and ingenuity.

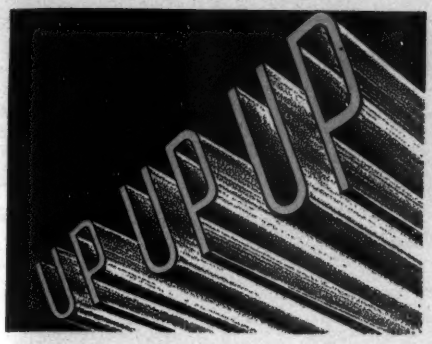
The use of cement placed behind a string was the accepted method of shutting off water, but the time required for the cement delayed drilling operations some two weeks and this was valuable time lost. Likewise the time necessary to mix by hand and place several hundred sacks of cement was too long for best results. Dr. F. Huber perfected a chemical which, when added to the water used for the cement mixture, produced reactions in four days which formerly took fourteen. This was later known as the Perkins four-day cement process.

High powered orators held forth under the canvas, selling tiny fractions of a percent in gushers.

Halliburton then perfected a cone shaped hopper, the cement was dumped in at the top and water under high pressure forced through an orifice at the bottom, resulting in a uniform mixture in rapid time. Dr. Huber then gave the operators an instrument to locate the



At left, Shell Martin No. 1 blew in after standing cemented two days, with estimated 75,000,000-ft. gas flow. Right, General Pete's Black & Drake No. 1 disproved theory oil would not be found west of Cherry Ave.



UP 39.25% – VOLUME OF DISPLAY ADVERTISING IN CALIFORNIA OIL WORLD

Total lineage for the first six months of 1938 over the last six months of 1937 was UP, 39.25%! Almost without exception, each fortnightly issue of CALIFORNIA OIL WORLD from January 1st to June 30, 1938 contained the first advertisement of a new campaign!

Here's the place for YOUR sales message.

UP 11.70% – TOTAL NET PAID CIRCULATION OF CALIFORNIA OIL WORLD

With no field crews—no newsstand sales—no ballyhoo—the total paid circulation of CALIFORNIA OIL WORLD increased 11.70% from January 1st to June 30th, 1938 over the last six months of 1937!

During the same period more than 9 readers out of 10 renewed their subscriptions, either voluntarily or as the result of a reminder letter.

Buyers read your advertisements in California Oil World.

UP 85.60% – NUMBER OF SUBSCRIBERS TO CALIFORNIA OIL WORLD NEWS REPORTS

Subscribers to CALIFORNIA OIL WORLD NEWS REPORTS increased during the first six months of 1938 at the rate of 85.60% over the last six months of 1937!

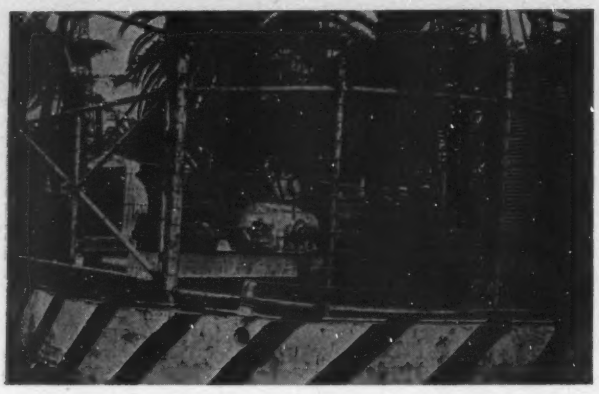
This complete "scouting" service has proved of great value to the Petroleum Industry and its suppliers. PROOF? almost double the number of subscribers who tell us "not only a big help to our sales department, but a guide to our inventory policy."

This Service is free to advertisers—an added value for every advertising dollar.

CALIFORNIA OIL WORLD

536 PETROLEUM SECURITIES BLDG.
Phone RIchmond 2136
LOS ANGELES, CALIFORNIA

The World's Smallest Oil Producing Lease



Of Signal Hill's many claims to fame, one of the most interesting is its boast of containing the world's smallest producing oil lease. Located at the very crest of the hill, a small triangular shaped parkway at the intersection of two streets had never been dedicated for either park or street purposes, and though the title remained in private hands, had never been drilled because of its diminutive size. Not until 16 years after the property was known to top one of the world's richest oil fields was any attempt made to drill it. Roughly triangular, dimensions are 48 ft. in greatest length and 36 ft. in greatest width; a tract not readily adaptable to the drilling of oil wells. These circumstances were for many years more than sufficient to discourage drill site seekers even in this crowded townlot field.

Early in the year 1937, however, Bass & Goodnight, an aggressive independent firm, decided that nothing was impossible and forthwith erected an 80-ft. derrick with a 20-ft. base. A small draw works, driven by a converted bus engine, was installed and a mud pump rigged up with a Ford V8 motor. Two 250-bbl. tanks were used for settling and slush pits. Another was used for the cellar.

With this light equipment and using short drill pipe stands, the well was completed at 2522 ft. with an average production of 35 bbls. a day cutting 4 per cent. Surface casing is 11¾-in. at 600 ft. and the 7-in. water string is cemented at 2461 ft.

To date the Long Beach field averages well over 400,000 bbls. per acre total oil recovery, this lease, being 1/30th of an acre in area should therefore ultimately produce 14,000 bbls. of oil. What's that about liars figuring

(Contniued from Page 38)

point of entry of water in a well. This became known as the "Water Witch."

Representatives of various supply companies did their part in furnishing equipment and adding improvements, a few names may be mentioned; George Trembly, Edward Palmer, Frank Champion, Joe Seigel, Les Black, Jim Conlon, Tom Hickey and Ben Stroud.

Drilling operations slowed down at times but a new area would soon be opened up and the activity started all over again. New fields were discovered such as Dominguez, Athens-Rosecrans and Inglewood, but Signal Hill just kept "rollin' along," until on January 1, 1938 the recovery had been 460,000 bbls. per acre, and today the whole field is credited with a potential of approximately 60,000 bbls. for 1270 wells.

Many names have probably been omitted from the list of those who pioneered one of the world's most remarkable oil field, but the real purpose of this article is to pay tribute to all of those who took part in the passing parade of California oil field development.

Mr. Shaver, who is petroleum engineer for Bolsa Chica Oil Corp., was graduated from Colorado School of Mines in 1907 and followed his profession of mining and hydraulic engineer until the lure of oil captured him in 1921. Believing that the best way to thoroughly learn the business was from the ground up, Mr. Shaver's first job was roughnecking in the Huntington Beach field, incidentally for the Bolsa Chica company. With the opening up of Long Beach the same year, he was transferred to that field where he made his first acquaintance with the colorful personalities of which he writes. Satisfied with his field experience, Mr. Shaver accepted a position as inspector with the state Mining Bureau which he left in 1923 to become field engineer for the Union Oil Co.

After six months with Union, he became identified with the Long Beach engineering staff of the Shell Co. During his eight-year tour with Shell, Mr. Shaver enjoyed many interesting assignments in many places, but most of the time he was one of the inner circle attempting to solve the secrets of Signal Hill. In 1932 he returned to Bolsa Chica as engineer for the company which gave him his first start in the oil business.

Mr. Shaver, for the California Oil World, has attempted what is admittedly an impossible task. Never did a California field attract such a colorful array of interesting personalities as those which crowded the early development of the famous "Hill", and any chronicle of them must necessarily be incomplete. This brief sketch does, however, serve to re-introduce some of the men responsible for making the Long Beach field one of the world's greatest.

Fourteen oil companies have perfected plans for a national credit card exchange plan to cover the United States and Western Canada.

De Soto Well Deep Test of Lovelady

Perhaps the most important well now drilling in California is De Soto Oil Co.'s deep test of the famous Lovelady pool in the Long Beach field. With 13⅜-in. casing cemented over the Brown zone at 4252 ft., the well is making hole through the old producing sands below 4300 ft.

On the theory that the 7000 ft. wells drilled on the Hill 10 years ago drifted far from their surface locations and generally into unfavorable structural positions the group of independent operators backing De Soto believe that a vertical hole in this location will open up what might be called a new oil field lying beneath the present Long Beach-Signal Hill field. No tests are contemplated by the company above 6500 ft. and the well is equipped to go to record depths if necessary, according to R. W. (Rocky) Jerman, president.

Should this project be successful in developing a super-deep zone, as many compentent engineers believe that it will, the greatest drilling boom since the field's last big show in 1928 will be precipitated. The major part being divided into small, town lot leases, Signal Hill lends itself to the most spectacular type of development.

Field Development

Los Angeles Basin

Long Beach Field Oil Interest Center

Now, more than at any time in years, the attention of the petroleum industry is centered on the Long Beach-Signal Hill oil field.

The northwest extension, developed during the past year and known to be of limited extent in the Alamitos and Brown zones, has within the past three weeks, been further extended by the completion of an excellent deep zone well beyond the productive limits of the shallower horizons. As two wells, 8580 and 9285 ft. in depth, have been drilled between the new outpost and the Dominguez field, it is highly improbable that production will be found throughout the saddle between Los Cerritos and Dominguez, despite over-optimistic opinions to the contrary. It is, however, quite possible that present limits may yet be materially extended. Fortunate, indeed, it is, in the face of present market conditions, that leases are large and no great drilling campaign will result. Neither Hilldon nor Caminol, chief beneficiaries of the new discovery, contemplate a rapid exploitation program.

The new producer, Dominguez No. 1 of the Hilldon Oil Co., is located northwest of the county Flood Control Channel near Carson St. and is about half way between two old abandoned wells which were not carried to sufficient depths. After reportedly penetrating the Miocene 1000 ft., the well was bottomed at 7786 ft. and casing set at 7737 ft. A swabbing test of this interval resulted in the recovery of nearly 200 bbls. a day of clean oil, but gas pressure was insufficient to make the well flow. The casing was then perforated between 7705 and 7730 ft. in a known sand body resulting in the fluid pouring over the casing head before the perforator could be removed from the hole. Through the casing, production was 750 bbls. of 24 gravity clean oil and 1,700,000 cu. ft. of gas. Subsequently, tubing was run and the well completed in the conventional manner flowing at the rate of 375 bbls. of oil and 400,000 cu. ft. of gas through a 32/64-in. bean.

Next operation for Hilldon will probably be another well on the neighboring Flood Control lease.

Caminol Co. Ltd., which holds 30 acres offsetting the new producer, will start drilling within a short time.

A. S. Johnston Drilling Co., Well No. 34 is at present the only drilling project in the extension area, and when last reported, was coring for the top of the Alamitos zone below 3900 ft.

Carmenita Well Suspends at 6000, Sec. 21, 3-11

After fulfilling their contract to drill to 6000 ft., John McKeon and Associates have suspended the exploratory well located in sec. 21, 3-11 and known as Carmenita No. 1. The bottom of the hole is said to be yet in Pico formations. Negotiations are in progress to deepen the well.

New Operations Start in Torrance Extension

The new Torrance extension, discovered by D. & B. Oil Co., is taking on the appearance of an oil field with the starting of operations by several companies. General Petroleum Corp. has derrick erected for Poggi No. 9 and F. E. Fairfield has started a second project after turning his first to Insco Petroleum Co., a new concern headed by Emmet Jones. Caminol Co., Ltd. has made a location for a well to be called Torrance No. 1-11. D & B Oil Co. will drill its second well one block west of the discovery No. 1 which is now flowing 190 bbls. of 30 gravity oil cutting 10 per cent mud.

Texaco Deepens in Seal Beach Field

The Texas Co. is rigging up to deepen its 4917-ft. Alamitos No. 3 in the Alamitos Heights sector of the Seal Beach field. This is the first active well in the field since the abandonment of Continental's deep test more than six months ago.

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Los Angeles County					
Bellflower	Clayton, Geo. L., Scott	1	32, 3-12	6897	Idle
Brea	Pressel, Perry, Tull	1	30, 2-9	4560	Idle
Castaic	Royal Land Corp.	1	8, 4-17	950	Drilling
La Mirada	John McKeon & Assoc. Carmenita	1	21, 3-11	6000	Idle
Newhall	Barnsdall Oil Co., R.S.F.	3	26, 4-17	7264	Completed
	National Pet. Corp.	1	27, 4-16	2475	Idle
	Palmluck Oil Co.	1	23, 3-16		Rigging up
Palmdale	Antelope Valley Pet.	1	17, 6-12	50	Idle
Palos Verdes	Gene McLaren	1	27, 4-14	3992	Idle
	Rolling Hills Pet.	1	27, 4-14	4450	Drilling
Pico	British Am. O. P. Co.	1	12, 3-12	4568	Idle
San Fernando	Tidewater Assoc., Porter	1	27, 3-16	1575	Drilling
Whittier	Langstaff, Geo. W., Iliff	1	8, 2-11	1550	Drilling
San Bernardino					
Chino	So. Counties Pet. & Drlg. Co.	1	26, 2-8	425	Drilling
Orange County					
Costa Mesa	A. V. Oil Gas. Co.	1	16, 6-10	4215	Drilling
Kraemer	Congress Oil Co., Kraemer	1	36, 3-9	3017	Testing

There are
124
Wells in the World
more than
10,000 ft. deep
•
94%
OF THESE WELLS
drilled with
PATTERSON
BALLAGH
PROTECTORS

. . . and thousands of wells less than 10,000 feet were drilled with them, too!

ASK FOR FREE WALL CHART
LISTING ALL DEEP WELLS

PATTERSON-BALLAGH CORP., Ltd.
Plant and General Offices: 1900 East 65th St., Los Angeles, Calif. • Mid-Continent Office: 1507 Maury St., Houston, Texas • New York Office: 39 Cortlandt St., New York City.

Wilmington Wells Set Big Potentials

By far the largest of eleven wells recently completed in the Wilmington field were brought in by Republic Petroleum Co. in the West 7th St. area of Long Beach Harbor. Harbor No. 1 finished in the Ranger and both Terminal zones, was bottomed at 4020 ft. and completed establishing a potential of 5466 bbls. of 27 gravity clean oil. Two days later, Harbor No. 2 came in from the same horizons flowing at the rate of 6000 bbls. Both wells were beaned back to 600 bbls. in conformity with the curtailment program of the field. On its adjoining Newport lease, Universal Consolidated Oil brought in No. 4 under wraps, the initial flow not being allowed to exceed 1200 bbls. This well is also producing the Terminal zones.

Richfield Oil Co. completed another well, No. 5, on the Pacific Dock lease. Bottomed at 3645 ft., the yield was gauged at 750 bbls.

Near the Edison plant at the harbor entrance, Royalty Service Corp. finished its P. E. No. 1 flowing better than 2000 bbls. from the Terminal zones.

First few hours gauge credited Union Pacific, P. D. No. 1 with production at the rate of 965 bbls. The well is bottomed at 4073 ft. and is perforated in the Terminal zones.

General Petroleum Corp., finding Blinn No. 3 wet from 3590 ft. to bottom at 3645 ft., plugged to 3525 ft. and swabbed the well in flowing 210 bbls. On the S. P. property, the company finished No. 10 as a typically large Terminal zone well.

Bankline Oil Co. brought in its first Ranger zone well in the central harbor district when U. P. No. 7 at the corner of 1st and Santa Clara Sts. was finished at 2965 ft. flowing 275 bbls. of 17.5 gravity clean oil.

Harbor No. B-10 was completed by Hancock Oil on the shipyard lease flowing at the rate of 825 bbls. from the Ranger and Terminal zones.

Macson Oil Co., O-55-1, located at the corner of "L" and Broad Sts. in the Wilmington townlot area, was completed with a flow of 350 bbls. from 3675 ft.

Two Completions Due at El Segundo

Apex Petroleum Corp. is completing its Elsie No. 3 and Burnoel Oil Co. is preparing to swab its Elsie No. 1 The wells are bottomed in schist at 7400 ft and 7335 ft. respectively.

Four Good Producers Completed In Rosecrans

Four wells have recently been finished in the mildly-booming Rosecrans field adding more than 4500 bbls. of new production. Union Oil Co., with the completion of Rosecrans No. 20 at 7855 ft. flowing 1400 bbls. and No. 23 at 7770 ft. for 1800 bbls. obtained the largest total.

Barnsdall Oil Co. brought in its fourth well on the Trust lease flowing 1282 bbls. Bottomed at 7800 ft., an 8⅝-in. water string was cemented at 7275 ft. and a perforated liner landed on bottom.

In the most southern sector, Superior Oil Co. completed its important outpost, Callender No. 1, flowing 350 bbls. of 32 gravity oil cutting 1.0% Encountering productive formations lower than wells to the north, Superior set casing at 7590 ft. and bottomed at 7675 ft.

Union Oil Co. is yet the most extensive operator in the field, having two wells drilling and a third rigging up. Barnsdall Oil Co. has one project, Rosecrans No. 9, nearing completion and is moving in equipment to drill Trust No. 5.

Discouraged by much mechanical trouble with the old hole, Howard Oil Co. has, temporarily at least, given up trying to redrill the old Union Oil Co., Gordon No. 1 at the west bend in Main St. Abandoned by the original operator many years ago at 6640 ft., Howard succeeded in redrilling to only 4800 ft.

Universal Consolidated Oil Co., which recently completed Trust No. 3 as a typically good well, will in the next few days bring in No. 4, now drilling below 7300 ft.

Latest operator to enter the field is F. E. Fairfield, who has chosen a location 1100 ft. south and 400 ft. west of the intersection of Rosecrans Ave. and Main St. on the Abel property.

Treasure Oil Co., Venice No. 7, outpost well seeking a southwesterly extension of the Playa Del Rey schist production is now standing idle at 6510 ft.

Two Wells Exceed 100 in Yorba Linda Field

Two of the best wells yet obtained have recently been completed in the Yorba Linda field. Millerand Petroleum Co., Miller No. 1, with 50 ft. open to bottom at 1735 ft. is pumping an estimated 145 bbls. cutting 5 per cent and J. Pearl Oil Corp., Dobashi No. 1, with 55 ft. open to 1800 ft. is estimated at 110 bbls. cutting 10%.

● Modern, stream-lined delivery trucks keep us Signal Dealers well-supplied with gasoline, oils and other products.

● Natural gasoline extraction towers in operation at Signal's Plant No. 8 located on Signal Hill near the famous discovery well, Alamitos No. 1.

● From Canada to Mexico . . . Signal Dealers are ready to serve motorists in Washington, Oregon, Idaho, California, Nevada, Arizona and British Columbia.

● Air view of the Elwood Oil Field near Santa Barbara showing Signal producing wells in the foreground.

● One of four Signal Schools where we Signal Dealers become school-trained specialists for your safety and economy.

● Signal Products are tested many times daily in the laboratory by refinery engineers.

Millions Agree You DO

GO FARTHER with SIGNAL

Signal gives extra miles per gallon because it forms a ready-burning mixture of fuel and air, and none is wasted through the exhaust. **All** the fuel burns.

You'll find friendly Signal neighborhood dealers from Canada to Mexico to render those helpful services—which combined with Signal products — will help **you** GO FARTHER!

Signal Gasoline **Signal 100% Pure Pennsylvania**
Signal Batteries **Motor Oil**
Signal Chek-Chart Lubrication **Lee Tires**

SIGNAL OIL & GAS CO.

Torrance Activity Moves Southward

With fifty-five projects now under way, the new Torrance townlot drilling boom appears to be approaching its peak. Starting at Sepulveda Blvd., the procession of new rigs has marched steadily southward, with the greatest activity now centering on 235th St. between Narbonne and Pennsylvania Avenues. The vanguard, however, has already reached 240th St. where Blue Bell Petroleum has erected a derrick. Belief that the number of active projects will not materially increase is gained from the fact that many of the wells started with discovery of good production between 229th and 231st Streets will soon be finished and the next two weeks will see a flood of completions as far south at 235th St. Several wells along the latter street are now preparing to go on production and if yields are as good as is anticipated, new ones will be started as fast as wells are completed. This steady march will continue until the inevitable edge is reached.

When activity was confined to the northern section, wells east of Narbonne were generally too small to justify 5000-ft. drilling but as development progresses to the south, several operators are again stepping out as far east as Eshelman. Extension to the west is blocked by the large holdings of the major companies. Standard Oil Co. and Pacific Western are preparing to deepen offset wells in this sector.

Completions on 231st and 233rd streets have, with two exceptions, been over 350 bbls. Silver Beach Oil Co. brought in the first well on the latter street east of Pennsylvania with an initial flow of 450 bbls., followed shortly by the completion of the Andrews-Kirk Lomita No. 11 for an estimated 600 bbls.

MacDonald & Burns continued their enviable completion record by swabbing in Moore No. 7 on 231st street at the rate of 610 bbls. Calmont Oil Co. No. 1, on the same street at the corner of Pennsylvania, came in flowing 675 bbls.

Chas. W. Camp, highly successful in two other wells, has so far been unable to complete No. 13, an offset to Calmont.

Independent Drilling Corp. No. 1, located on 231st St. between Narbonne and Pennsylvania, came in with an initial flow of 475 bbls. Hampshire Oil Co., No. 1, located one block north and 300 ft. east, wouldnot flow and was finished on the pump for 225 bbls. cutting 4%.

St. Helens Adds Montebello Well

St. Helens Petroleum Co. added another good well to its West Montebello string with the completion of Monterey No. 27 in the Sixth zone. Bottomed at 6279 ft., 772 ft. of 7-in. blank liner was cemented at 6157 ft. and the well swabbed in flowing with the rate unestimated at press time.

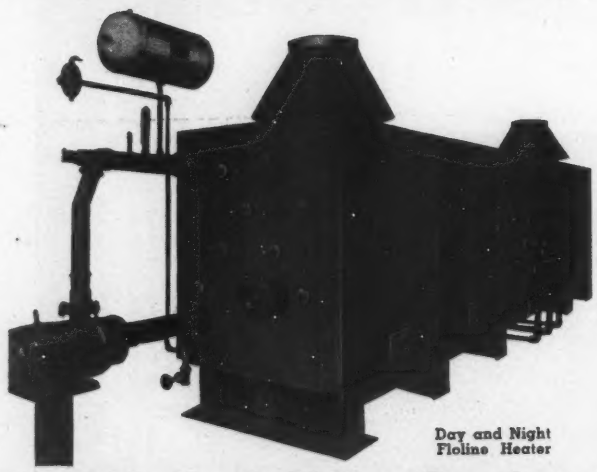
Standard Oil Co. is thoroughly testing by stages while coring the Firth zone in McDonald No. 1, the well flowing clean oil from the interval 5520 to 5580 ft.

Union Oil Co. Howard & Smith No. 2 and V-8 Oil Co. Estelle No. 1 are both coring the Fifth zone below 5400 ft., while McVicar & Rood, Manz No. 2 is drilling in hard formations at 5675 ft. and West Montebello Oil Co. No. 1 is making hole below 4500 ft.

Herley-Kelley No. 1 is preparing to kill a 1400 bbl. flow to locate the source of a 40% water cut. The well is bottomed in the Sixth zone at 6300 ft.

Brookline Oil Co., Drake Comm. No. 1, southwest outpost at Beverly and Maple is making a production test with bottom at 6444 ft. after water shutoff tests were inconclusive.

HEATING OIL
FOR
DEHYDRATION — CLEANING — SHIPPING



Day and Night Floline Heater

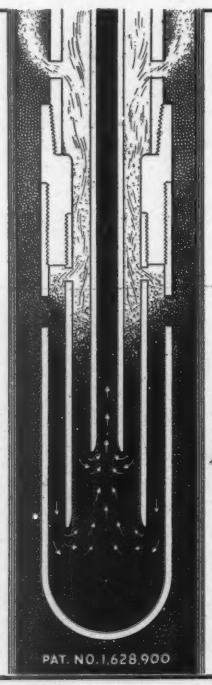
Backed by Nearly 30 Years Experience

in water heater manufacture. Day and Night has developed a line of oil heating equipment embodying patented features which assure more rapid heat transfer, more certain results and more dependable automatic operation.

Heaters and interchangers for tank or floline use, developed especially for the oil production industry.

Whether your production is great or small, write for references and full information.

THE DAY AND NIGHT WATER HEATER COMPANY
MONROVIA, CALIFORNIA



Let's Face Facts

YOU CAN'T
PUMP GAS WITH
AN OIL WELL PUMP
BUT
YOU CAN
SEPARATE GAS
FROM THE OIL
WITH
THE NEILSEN SEPARATOR

1 CUTS HEADING
2 REDUCES GAS LOCKING
3 INCREASES VOLUMETRIC EFFICIENCY OF PUMP

SUCCESSFUL OIL AND GAS SEPARATION IN MORE THAN 600 CALIFORNIA WELLS

PHONE OR WRITE
NEILSEN PUMP COMPANY
3204 CHERRY AVENUE ~ TELEPHONE 419-31
LONG BEACH, CALIFORNIA

BRANCH STORES
TAFT
199 Supply Row
— Phone 439 —
BAKERSFIELD
3024 Chester Ave.
— Phone 6353 —
VENTURA
1701 N. Ventura Ave.
— Phone 5231 —
SANTA MARIA
Petroleum Service Bldg.
Phone 544

San Joaquin Valley

KNDA Completes Three Big Wells

Three large wells have recently been placed on production by the Kettleman North Dome Association. Topping the list in point of yield is No. 58-16Q which, bottomed at 8100 ft., flowed initially 4295 bbls. of 37 gravity oil cutting 4% and 3,000,000 cu. ft. of gas with two-inch beans on tubing and casing. No. 47-18Q, finished in the same horizon at 8005 ft., came in at the rate of 3285 bbls., clean, and 3,190,000 cu. ft. of gas.

Well No. 67-20J was carried to the Eocene and bottomed at 11,041 ft., where a 4¼ in. liner was landed, perforated at intervals below the 6⅝ in. water string at 10,523 ft. With 3 in. tubing to 9518 ft., the well was swabbed in flowing 925 bbls. of oil and 133 bbls. of water through a 52/64 in. bean. Accompanying the 47 gravity oil flow was 20,000,000 cu. ft. of gas which built up a flow pressure of 1600 lbs. and a casing pressure of 2100 lbs.

Union Completes 2nd Rio Bravo Producer

With a flow of 2725 bbls., Union Oil Co. brought in Kernco No. 3, sec. 34, 28-25, the first to be placed on production by the company since its discovery of the field last November. The initial flow was through a 27/64 in bean and was accompanied with 4,025,000 cu. ft. of gas. Pressures were 1650 lbs. on the tubing and 1975 lbs. on the casing.

Kernco No. 3 is the highest structurally of any well yet drilled, having topped the Rio Bravo sand at 11,215 ft. A 7 in. water string is cemented at 11,206 ft. and the lower portion of the hole is protected with a perforated liner. Total depth is 11,470 ft., giving a sand penetration of 255 ft.

Geisinger No. 2 drilled in the phenomenal time of 63 days, was completed by Superior Oil Co. flowing 1600 bbls. through a 20/64-in. orifice. With the bean reduced to 12/64-in., present production is 500 bbls. of 39 gravity clean oil with pressures of 1800 lbs. on the tubing and 1900 lbs. on the casing head. Located on the north flank of the fold, the well was bottomed at 11,465 ft. with casing set at 11,325 ft.

Superior's Anderson No. 1, another north flank well in sec. 35, has been killed to locate the source of a 30% water cut.

The field's most southeasterly outpost, Superior Oil Co., Helbling No. 1 in sec. 1, 19-25, is reported to have found the Rio Bravo sand questionable in appearance, but has a new oil bearing sand at 12,220 ft.

Eight projects are now underway in the field; Union Oil Co. having three, Superior two, Geo. F. Getty, Inc. one and General Pet. two.

Amerada Pete Drops Beer No. 5 Well

Closing for the time being one of the most extensive wildcat campaigns ever waged by a single company to locate an oil field, Amerada Petroleum Corp. has abandoned Beer No. 5 in the Devils' Den-Blackwells' Corners area. Located in sec. 22,26-19, Beer No 5 was originally drilled to 8298 ft., several formation tests being made which revealed only gas and salt water. Later the well was redrilled to 7665 ft. and several of the formerly tested zones tried a second time with no great net improvement.

SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
Fresno County					
E. Coalinga	Pure Oil Co., SPL	1	31, 18-17	10960	Drilling
Clovis	Central Valley Oil Co.	1	1, 12-20	588	Idle
Jacalitos Hills	Jacalitos Pet. Co.	1	14, 21-15	6035	Drilling
	Dauphin Dev., Boone	1	30, 21-14	3780	Abandoning
		2	30, 21-14		Grade
Panoche Hills	Panoche Hills Oil Co.	3	12, 14-11	300	Idle
Kern County					
Arvin	Petrex, Inc.	1	32, 31-30	5286	Abandoned
	Union Oil Co., Berry	1	15, 31-29	6812	Abandoned
Belridge	Abbott, F. E.	1	18, 27-19		Rig
	General Pet., St. Helens	1	12, 28-20	8683	Abandoned
	Shell Oil Co., Voight	4–13	2, 27-20	910	Testing
Buena Vista	Ohio Oil Co., KCL	A-8	32, 31-26	11186	Testing
Devils Den	Amerada Pet. Co., Beer	5	22, 16-19	8295	Abandoned
	Gibson Oil Co., Alferitz	3	14, 25-18	710	Drilling
	Goodrum, Geo., Baron	1	24, 25-18	1210	Idle
Dominion	Dean, Geo. W.	1	26, 26-28	1177	Abandoned
Edison	Stevens, Ray	1	22, 30-30	1010	Drilling
Elk Hills	Richfield Oil Corp. KCL-W	1			Rig
Fruitvale	The Texas Co., C.W.L.	1	7, 29-27	7100	Drilling
	Continental Oil Co.	B-2	12, 29-26	4850	Drilling
Grapevine	Petrol Corp., Reserve	5	33, 11-99	4607	Testing
	Richfield Oil Corp. KCL-1		28, 11-20	5175	Drilling
Lerdo	Standard Oil Co. KCL 18-1		29, 28-26	10100	Drilling
McFarland	Tidewater Assoc. Oil Co.,Pond	1	17, 26-25	7515	Drilling
	Shell Oil Co., KCL	83–35	35, 26-25	9475	Drilling
Poso Creek	Reynolds Oil Co.	1	20, 27-27	2855	Idle
	Harkness & Laws, Hunt	1	28, 27-27		Foundation
Richgrove	Dilamar Oil Corp., Quinn	1	15, 25-27	2956	Testing
		3	15, 25-27		Rig
San Emigdio	Shell Oil Co. KCL 4-26		26, 11-22	9825	Redrilling
Strand	Continental Oil Co.	E-1	17, 30-26	8575	Testing
Temblor Hills	Chico Martinez Oil Co., Holly	1	1, 29-20	1108	45b/d—20%
Union Ave.	Richfield O. Corp.,Union Ave.	1	6, 30-28		Foundation
Kings County					
Alpaugh	Tri Counties Oil Co., Olson	1	10, 23-22	7200	Drilling
Dudley Ridge	Falcon Oil & Gas Co. No.	1	24, 23-20	6500	Idle
Pyramid Hills	Pyramid Prod. Co.,Retherford	1	27, 24-18	3090	Idle
Kettleman	Temblor Oil Co., Bunting	1	25, 23-18	9138	Plug 7815—Idle
Tulare County					
Alpaugh	Sullivan & Youngdahl	1	33, 23-23	2732	Idle
Ducor	Nelson & Davison	1	1, 24-27	375	Idle
Trico	Caminol Co., A. O. G.	3	29, 24-24	7555	Prep. to deepen

NORTHERN COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
Colusa	Amerada Pet. Co.,Calif. Lands	1	34, 16-1	5686	Drilling
Glenn	Ohio Oil Co., Willard	2	18, 20-2	5717	Drilling
Humboldt	The Texas Co., Eureka	2	22, 3-1	7708	Plug 6473-Shut in
Monterey	The Texas Co., Lewis	1	13, 19-5	635	Drilling
San Mateo	Wilshire Oil Co., Cowell	1	20, 6-5	8007	10 B/D
Solano	Richfield Oil Corp., Potrero	1	10, 4-1	3373	Testing
	The Texas Co., Midland	1	4, 3-3	4030	Completed

Shell Voight Tests Shallow Showings

A most interesting test is now being made by the Shell Oil Co. in its Voight No. 4-1 in sec. 32, 27-20 in the Antelope Plains. Drilled to 910 ft., 4¼ in. casing was landed at 850 ft. which was perforated at intervals below 520 ft. where it was cemented through perforations.

Three Valley Tests Are Disappointing

Disappointing indeed have been recent tests made in three different valley floor exploratory wells.

Ohio Oil Co. cemented 7-in. casing 40 ft. off bottom in its 11,186 ft. KCL A8 and swabbed only salt water after perforating the interval 10,118-10,144 ft. corresponding to the Stevens zone of Ten Sections. The well is a deep test of the Buena Vista gas field and is located in sec. 32, 31-26. Further tests will be conducted.

Standard Oil Co. drilled its second Canfield Ranch well, KCL No. 15-2, to 8121 ft. and plugged to 8095 ft. where a series of formation tests proved inconclusive. The hole, located in sec. 27, 30-26, is being cleaned out to deepen.

Continental Oil Co. deepened its Strand test well, KCL E-1, sec. 17, 30-26, to 8575 ft. and plugged to 8230 ft. where further production trials resulted only in the recovery of water. No decision has been reached as to final disposition of the well.

Richfield Starts Union Avenue Well

What promises to be the valley's "hottest" wildcat is now being started by Richfield Oil Co. in sec. 6, 30-28 south of Bakersfield in the once famous Union Avenue area. Derrick for the new well has been built 990 ft. south and 330 ft. west from the center of the section, not far distant from the site of the Pacific Eastern Production Co. well, which, eleven years ago gave promise of discovering a new field. Richfield will not only "look" at the 4400-ft. zone from which the old well flowed 8,000,000 cu. ft. of gas, but will search for the Greeley and possibly lower horizons.

Jacalitos Petroleum Seeking Eocene Oil

Jacalitos Petroleum Co., after a period of idleness, has resumed work on its sec. 14, 21-15 test of the Jacalitos Hills and is seeking production from the Eocene following the completion of the Gatchell well in that formation. Bottom, when last reported, was at 6045 ft. in hard shale.

Farther to the west in the Waltham Creek area, Dauphin Development Co. is abandoning its 3780 ft. Boone No. 1 in sec. 30, 21-14.

General Pet. Drops St. Helens 1 at 8685

When a production test of the 1400-ft. zone failed to come up to expectations, General Petroleum Corp. abandoned St. Helens No. 1, exploratory well located in sec. 12, 28-20. A production test of the shallow zone yielded only an average of 15 bbls. daily of 23 gravity oil cutting 60%. The well was drilled in hopes of encountering production in the North Belridge Wagon Wheel horizon and was carried to a final depth of 8685 ft.

Petrol Grapevine Test Sands in Brief Flow

The Petrol Corp. bottomed its latest Grapevine well, sec. 33, No. 5, at 4607 ft., plugged to 4582 ft. and swabbed in flowing gas and a little oil. Within a few hours, the well sanded up and has not yet been returned to production.

CUT PRODUCTION COSTS WITH

JENSEN PUMPING UNITS

MADE IN 7 SIZES

MEDEARIS

OILWELL

SUPPLY COMPANY

8638 OTIS STREET SOUTH GATE, CALIF.

JEfferson 7285

BAKERSFIELD • AVENAL • SANTA MARIA • VENTURA

4448 421 544 3964

Just Say---

YES! You may send me the CALIFORNIA OIL WORLD for one year, for which I enclose $1.00.

For Foreign Countries, $2.00

Name _____

Address _____

City _____ State _____

Position _____ Company _____

Check branch engaged in Producing..... Refining..... Natural Gasoline..... Marketing..... Manufacturing

Subscriptions accepted only from persons actively connected with the oil industry.

California Oil World, 714 W. Olympic Blvd., Los Angeles

E. Coalinga Eocene Pool Now Active

Following Petroleum Securities Co.'s recent discovery of Eocene production in sec. 18,20-16, the east Coalinga area is rapidly becoming one of the hottest spots in the state. Gatchell No. 2, now pinched back with an 8/64-in. bean, is flowing 325 bbls. a day with 290,000 cu. ft. of gas under 1225 lbs. flow pressure and 1800 lbs. casing pressure. The gravity is holding to 33 and the cut to 0.1%.

Three wells are now actually drilling, Universal Consolidated Oil Co. leading in depth at approximately 4000 ft. Petroleum Securities' offset to the discovery well is drilling below 2100 ft. on the Franklin C. Grimes Permit and Texas Co., Mohawk No. 19 is approaching the 2000-ft. level. These wells and Tide Water Associated's Guardian No. 33, which is rigging up, are all located in sec. 12,20-15. The Medford Oil Co.-F. C. Goetz well in sec. 10,20-15 and Pet. Sec.'s 7-7F in sec. 7,20-16 are preparing to spud.

Standard Oil Co., holder of much fee land in the new oil field, has foundations in for No. 82,13C in sec. 13,20-15. Superior Oil Co. has derrick up for its northeasterly outpost on the Hight permit in sec. 2, 20-16.

In sec. 18,20-15 of the Coalinga West Side field, Magnet Oil Co. is going ahead after cementing 8⅝ in. casing over the main producing zone at 2765 ft. If long range correlations prove correct, this well will reach the Eocene at about 4250 ft.

Pure Oil Wildcat Is Making New Hole

After many months of tedious fishing and sidetracking, Pure Oil Co. has at last succeeded in passing the old bottom of 10,861 ft. and is making new hole at approximately 11,000 ft. Known as S.P.L. No. 1, the well is located in sec. 31,18-17 and is the company's only active project in the state.

Shell Completes Two in Ten Section Field

Shell Oil Co. finished two Ten Sections wells with productions totalling 4000 bbls. No. KCL-B58, sec. 20,30-26 established a potential of 2500 bbls. and B-32, sec. 32, flowed initially at the rate of 1500 bbls.

Amerada Petroleum Corp. is spudding in its Olcese No. 1, a shallow test located near the Kern River in sec. 4,29-29.

Union, Petrex Drop Arvin District Tests

For the first time in more than a year the Arvin district of Kern county is without an active wildcat well.

Convinced by a prolonged pumping trial that commercial production was not in the cards for Berry No. 1, sec. 15, 31-29, Union Oil Co. is now abandoning the well. Carried originally to 6812 ft., the hole was plugged and recored through oil sands noted between 5900 ft. and 6135 ft. On the pump in this interval, production was about 25 bbls. a day of 22 gravity oil cutting 30%.

Petrex, Inc., Petrex No. 1, located in sec. 32, 31-30, is being abandoned at 5286 ft. in granite.

Timber Canyon Test Pumping 10 Bbl at 800

Stallings, Senter & Ahlburg, co-partnership operating in Timber Canyon, have plugged their No. 1 well from 1420 ft. to 800 ft. where it is now on the pump with production estimated at 10 bbls. a day. Casing is perforated below 350 ft.

Houston Oil Show Preparations

Tide Water Associated's Women Employes

Attractively decorated and furnished, this roof clubroom was recently modernized for the one hundred and fifty-five women employees of Tide Water Associated Oil Co., Associated Division at the company's San Francisco headquarters. Offering cafeteria service, the lunch room provides the finest electrified kitchen equipment. Under the direction of Mrs. Margaret Travers, the noon day crowd is readily and rapidly served from a complete menu. Aside from the bright and sunny dining room, shown above, the women employees enjoy an adjacent glassed-in sun porch as well as a comfortably and artistically furnished lounge and rest rooms.

Coastal District

Santa Maria Field Has Outlet Problem

With an allowable of 18,925 bbls. and a daily production of less than 3000 bbls., Santa Maria Valley presents a picture unique in the history of oil in California. There are all too many instances of competitively drilled fields where production greatly exceeds the umpire's allowable, but nowhere else exists a situation similar to that in the big new Valley field, where the entire present output could be doubled by the opening up of a single well. Not alone is the general overproduction threat responsible for the shutting in of nearly all wells. The real answer lies in the quality of the oil itself. Averaging but little over 14 gravity, the crude is high in viscosity and sulphur content and though gasoline percentage is relatively good, there is practically no kerosene or gas oil. The problem of disposing of the residium is one which neither the Union Oil Co. nor the independent refiner has yet been able to solve. Union, having the only pipeline outlet for the field, has tried desperately to devise ways and means of utilizing the oil on a large scale, but so far has met with but little success, and, due to an alarming increase in its unrefinable crude storage, has been forced to shut down its own wells and stop all purchases. The small amount now being produced is being trucked to independently owned topping plants where it is blended with light crude in small proportion.

New development work is now confined to less than half a dozen wells. Section 27, erstwhile "Hot Spot", still leads in activity with three working projects. Greathouse Oil Co., Fortier No. 1 is drilling below 3740 ft. and Sunshine Oil Co. is completing Wallace-Gerard No. 1 from 4190 ft. after cementing 8⅝ in. casing at 3875 ft.

Hancock Oil Co. and R. R. Bush Oil Co. are drilling their California Lands No. 3, sec. 30, below 3220 ft.

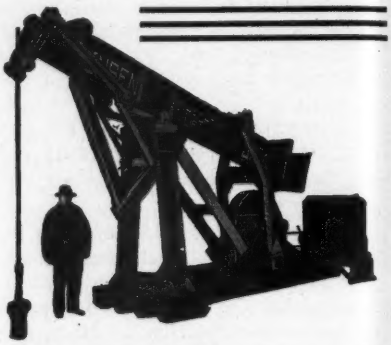
In the western portion of the field, E. H. Moore, Inc. is preparing to complete Union Sugar No. 10 after topping the Franciscan at 5235 ft. and setting 7⅝ in. casing at 4970 ft.

Pumping at a rate of 560 bbls. per day, Frank Vicente No. 3 in sec. 21 was completed by Union Oil Co. Gravity of the crude was 15 degrees and the cut was 20%. Vicente No. 3 was bottomed at 5322 ft., with casing set at 4830 ft. Location has been made for No. 4.

The drilling crew from this well now

COASTAL COUNTIES WILDCATS

Santa Barbara County					
Carpinteria	Carpinteria Oil Co.	1	32, 4-5	2460	Drilling
Carreaga	Douglas-Stratton Oil Co.	1	8, 8-33	6240	Testing
Cat Canyon	Standard Oil Co., Los Flores	1	27, 9-33	5950	Drilling
Coal Oil Pt.	South Crude Oil Co.	191–2	24, 4-29	5510	Redrilling at 4180
Gaviota	Gaviota Oil Co., Hollister	1	35, 5-33	3215	Testing
	Wilshire Oil Co., Hollister	1	35, 5-33	4600	Idle
Gato Ridge	Barnsdall Oil Co., Tog.	3	9, 8-32	3800	Completed
	Barnsdall Oil Co., Mag.	5	9, 8-32		Rigging up
	Petrol Corp., Mag.	5–11	9, 8-32		Rigging up
Los Olivos	United Western, Bradley	1	15, 7-30	3279	Idle
Lompoc	O'Donnell, J. E. Helen	1	8, 7-33	3580	Idle
Orcutt	Warren Deuel, Garrett	1	12, 9-34		Rig
Refugio	Tweedy, A. E., Penn.	1	34, 5-31	1700	Idle
Summerland	Gauthier Oil Co.	17–1	22, 4-26	1400	Idle
San Luis Obispo County					
Edna	Loma Grande Oil Co., Lewis	1	28, 31-13		Rig
Elk Horn	Calif. Pet. Prod. Co.	1	6, 10-24	1960	Drilling
	Western Plains Oil Co.	1	7, 31-21	4010	Idle
Huasna	Hancock O. Co.,Sherer-Dickes	1	30, 12-33	4700	Drilling
Paso Robles	Ajax Land & Dev. Co., Moss	1	27, 26-13	475	Idle
	Vanguard Oil Co.	1	14, 27-14	4360	Idle
Ventura County					
Moorpark	Darby Oil Co., Cohn	1	7, 2-19	3630	Idle
Oxnard	Walter G. Rowe, Johnson	1	15, 1-22	4705	Idle
Ojai	High Mesa Oil Co.	1	16, 4-22	1700	Drilling
	Holly Dev. Co., Macrate	1	27, 4-23	3010	Drilling
Red Mountain	Martin, J. W.	3	15, 4-21	1220	Drilling
Sespe	Commander Oil Co.,Temescal	7-F	13, 4-18	215	Idle
	Garmack Oil Co.	1	28, 5-19	565	Idle
	McKinnis, Chas., Crosby	1	14, 41-9	175	Drilling
	La Salle & Van Dissen	1	15, 5-19		Grade
	Merchants Pet., Cochran	8	1, 4-20	685	Drilling
	Speik Oil Co.	1	33, 5-19	3440	Idle
	St. Louis Oil Co.	1	1, 4-20	420	Cleaning out
	Terry, Geo., et al	1	23, 5-20	1340	Idle
South Mt.	The Texas Co., Richardson	5	13, 2-21	6125	Drilling
	Clipper Oil Co.	1	17, 3-20		Rig
Tar Creek	Section 20 Oil Co.	1	20, 5-19	1690	Drilling
Timber Canyon	Stallings, Senter, Ahlberg	1	24, 4-21	1420	Testing



CALIFORNIA is still ASTOUNDED!

The cost of lifting a barrel of oil in California is definitely DOWN. JENSEN Straight-Lift JACKS have accomplished that.

And there is no guesswork about it. We can tell you what to expect on your own lease, and from your next well. If we can't cut your costs we don't want your business.

Wire us at Coffeyville, Kansas, or get in touch NOW with . . .

A. V. TURNER
California Representative
Box 642 **Huntington Park**

STOCKED BY:
MEDEARIS OILWELL SUPPLY CO.
8638 Otis St. **South Gate, Calif.**

JENSEN BROTHERS MANUFACTURING CO.
Coffeyville, Kansas, U. S. A.

is preparing to spud in Union's second well on the Mallory lease, adjacent to the lower Orcutt Road in sec. 27,10-30. Union has one other string of tools working in this field, drilling below 4200 ft. in Vincent No. 5, near the center of sec. 25 in the original discovery area.

Santa Barbara Mesa Deep Test is Rumored

From Santa Barbara comes a persistent rumor that the long awaited deep test of the Santa Barbara Mesa will soon be drilled. Supporting the story is the known fact that the city has long insisted that the scenic Mesa become either a real oil field or the wells be abandoned to allow for the creation of a beautiful residential district. Only name yet associated with the projected test is that of Transoceanic Oil Co.

Coal Oil Point Well Standing Idle at 4188

Now idle at 5183 ft., South Crude Oil Co.'s Coal Oil Point well, Permit No. 191-2, has so far failed to encounter the Vaqueros sand which it hoped to find above the 4100 ft. level. A sizable fortune has been spent on this play, first by Bolsa Chica Oil Co. and later by sub-lessees, all to the end of discovering the productive measures of the Elwood field. South Crude has not surrendered the property, and may soon resume operations.

Darby Suspends Cohn 1 Near Moorpark

Darby Oil Co., failing to find the expected productive sands in Cohn No. 1 in sec. 7,2-19, near Moorpark, has suspended operations at 3630 ft. The bottom of the hole is said to be yet in Sespe formations which were topped at 1930 ft.

Continental Starts Test On La Laguna Ranch

Continental Oil Co., one of the most active wildcatters in California, has started preliminary work on another test of the Laguna ranch in Santa Barbara county. Located in sec. 25, 8-31, the new well will be drilled 3850 ft. south and 330 ft. west of La Laguna No. 1 which was abandoned in June of this year at 2646 ft. in schist. Monterey production similar to that at Gato Ridge is the objective of Continental. No other wells are now active in this area, United Western Oil Co. having suspended operations indefinitely after encountering schist in its Bradley No. 1 in sec. 15, 7-30.

San Luis Obispo Test Delayed by Fishing

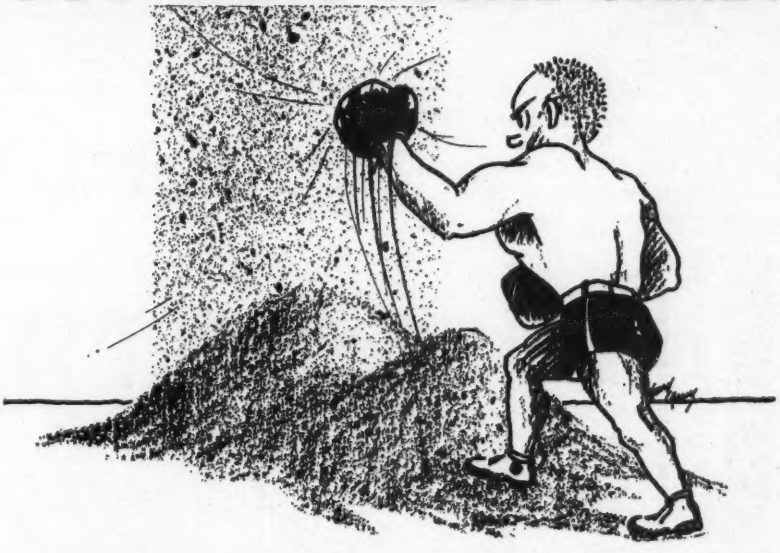
Scherer-Dicks No. 1, Hancock Oil Co.'s test of the Huasna area of San Luis Obispo county, encountered a fishing job immediately after passing through the hard, fractured brown shale formation into silty, gray sand. With hole bottomed at 4680 ft., the drill pipe stuck at 2100 ft. and oil is being circulated to facilitate its recovery.

American Society for Testing Materials has called the attention of its committee members to variations between fuel oil specifications issued by the Treasury Procurement Division and those promulgated May 31 by the A. S. T. M. and National Bureau of Standards. Copies of the latter, containing specifications for five grades of fuel oil for various types of fuel-oil-burning equipment, are available at the offices of the California Oil and Gas Association.

Remember the question of federal tideland confiscation is not settled; it is merely tabled temporarily. Be sure the candidate you vote for in the coming primaries stands firm on this vital issue.

We Still Say . . .

YOU CAN'T FIGHT SAND!



This saying is as true now as when we first used this picture several years ago. Sand is as destructive to the plungers and liners of an oil well pump as an emery wheel, and continued efforts to crush and grind sand will gall, score, and wear away the hardest pump parts.

FLUID PACKED PUMPS

do not fight sand—they produce it along with the oil. The liberal annular channels between tubes permit the handling of sand without danger of freezing, and with abrasive effect on the plunger held to a minimum.

If you have sand-cutting problems in your wells, you should know more about FLUID PACKED PUMPS—we have illustrated, descriptive bulletins ready to send you.

FLUID PACKED PUMP CO.
BOX 64 • LOS NIETOS, CALIFORNIA • U. S. A.
Mid-Continent and Texas Distribution
FLUID PACKED PUMP CO. — MID-CONTINENT
2 S. E. 29th ST., OKLAHOMA CITY, OKLAHOMA
Gulf Coast Headquarters: 3205 Harrisburg Blvd., Houston, Texas

Barnsdall Tognazzini 3 Another Gato Ridge Producer

Barnsdall Oil Co. obtained another good Gato Ridge producer in the completion of Tognazzini No. 3 for 1500 bbls. of 14 gravity clean oil. Drilled to 3800 ft., 10¾ in. casing was cemented at the top of the Monterey, 2127 ft. and the well pumped in through 3 in. tubing. Equipment is being moved to Magenheimer No. 5 located 3500 ft. to the southeast.

The Petrol Corp. will continue the development of its holdings in the field by drilling Magenheimer No. 5-11, for which derrick has already been erected.

Recementing Hollister 1 Near Point Concepcion

Gaviota Oil Co. is planning to recement its Hollister No. 1, near Point Conception after a two weeks pumping test resulted only in the recovery of salt water. Completed last year as a 10,000,000 ft. gasser, this well supplied fuel to the neighboring Wilshire Oil Co. well for many months before finally going all to water. Original depth was 3205 ft., but during efforts to shut off the water, 10 ft. more hole was made and casing cemented on bottom. It is now planned to "squeeze" the gun perforated holes in this liner.

Wilshire Hollister 1 Deepened to Sespe

Wilshire's Hollister No. 1, finding the Vaqueros (gas zone of Gaviota well) barren of both oil and gas, deepened approximately 1200 ft. into the Sespe. Several possible oil sands were given formation tests, but no production was found to bottom at 4600 ft. The well is now standing plugged to 4300 ft.

Standard Cores Oil Show In Cat Canyon Wildcat

Between the old Santa Maria and Cat Canyon fields, Standard Oil Co.'s Los Flores Land & Oil No. 1 is coring a broken brown shale formation reported to contain oil in the fractures. Casing has been cemented at 5400 ft. and new hole is being made below 5975 ft. Periodically a formation tester is run, the results of which are said to indicate that at least small production may be anticipated.

Macrate 1 Below 3000 Between Ventura Av.-Ojai

Holley Development Co., Macrate No. 7, Vaqueros test between Ventura Avenue and Ojai, is coring in hard Temblor shale below 3000 ft. This test, in which Seaboard Oil Corp. and Holly Oil Co. are also interested, is regarded as one of the most important in the entire coastal area.

Ventura Drilling Co., headed by Gustav A. Holtz of Los Angeles, has filed a notice of intention to drill a new well in sec. 10,3-23.

Carreaga Structure Test Is Proving Disappointment

Considerable disappointment was felt at results of a preliminary pumping test of Douglas-Stratton Oil Co.'s well on the Carrega structure. With 7-in. casing set at 5744 ft. and hole open to bottom at 6240 ft., 2½-in. tubing and pump were run to 5840 ft. On the beam, first production was mostly water, with the small oil percentage tending to increase. A belief has been expressed by some competent observers that continued pumping may, to some extent, exhaust the water and result in greater oil recovery.

Favorable report on the bill intended to keep the Elk Hills naval oil reserve intact was agreed upon by the House Naval Affairs Committee on June 14.

GO STRAIGHT
Young man!

One of the first things learned by today's rising oil man is the vital importance of drilling straight hole.

And from oil men everywhere he learns another important fact—that Crum-Brainard Rock Bits are famous for their ability to drill straight full-gauged hole, with maximum speed and longest bit life!

Write for Descriptive Bulletin

CRUM·BRAINARD

MAGNOLIA AT BLVD. • WHITTIER, CALIFORNIA

CB

BRANCH WAREHOUSES
PETROLEUM SERVICE CO. • SANTA MARIA, CALIF.
VALLEY WAREHOUSE • BAKERSFIELD, CALIF.
WEST SIDE SERVICE • AVENAL, CALIFORNIA

Argo Lost Hills 100-Bbl. Pumper

Indicating that gravel packing may yet be the solution to production problems in the north tip area of Lost Hills, Argo Petroleum Corp. deepened its Farnsworth No. 1A to 1335 ft. and recompleted on the pump for 110 bbls. after gravel packing a 5-in. liner with only the bottom 60 ft. perforated. Unlike most of the wells in the field, sand is bothering very little, the total cut being but 3%. Equipment has been removed from the Argo well in sec. 11, 26-20 to the Randon well in sec. 3, which is 1624 ft. deep and has been standing with 8⅝-in. casing cemented at 1532 ft.

Tide Water Associated completed Williamson No 11A with 50 ft. open to bottom at 1582 ft. but has refused to release the production figure.

Late Flashes

Barnsdall Finishes Third R. S. F. Well

Bottoming the hole at 7264 ft., Barnsdall Oil Co. placed on production its No. 3 well on the Rancho San Francisco lease in the Newhall-Potrero field. Completed just before press time, the first few hours gauge was at the rate of 1692 bbls. of 35 gravity oil cutting 4%. The water content appeared to be rapidly diminishing. The flow, through a 20/64-in. bean, was accompanied by an estimated 500,000 cu. ft. of gas. Tubing pressure was 990 lbs. and casing pressure was 150 lbs. and still building up. Production will be immediately curtailed.

More formation was taken in this well than either of its predecessors, the hole being open through liner perforations from the shoe of the water string at 6242 ft., a total of 1022 ft. Undoubtedly, if opened up, the well would show a much larger yield.

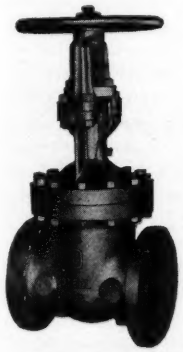
It is understood that the company's drilling program calls for the drilling of a fourth well within a short time. . .

Failure of opponents of the oil bill passed by the last special session of the Legislature to qualify signatures to obtain a referendum allowed the bill to become law at midnight on June 11.

Analysis of the proposed ordinance changing rates for the Los Angeles harbor disclose that the new rates affect the Petroleum industry only to the extent of about 10 cents per ton on package goods.

New Lunkenheimer Valves

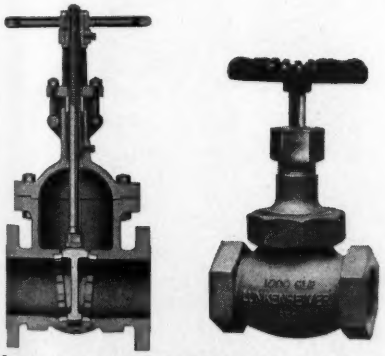
The Lunkenheimer Co. has recently developed a line of bronze valves for use in connection with deep well rotary drilling operations such as on drilling boilers, feed water and slush pump manifolds and also for high pressure gas, oil and hydraulic service.



Bronze Globe

Bronze Swing Check

Bronze Gate



Lunkenheimer 300 lb. SP Steel Gate Valves with A.P.I. Face to Face Dimensions

The valves are made in globe, gate, lift check and swing check patterns, and are suitable for 350 lb. steam pressure at 550°F. and 1000 lb. gas-liquid pressure at 150°F. The globe pattern is available with both the full-way and plug type nickel alloy seat and disc.

Steel valves for similar services with screwed or flanged ends are made in globe, angle, gate and swing check patterns, rated at 350 lb. SP 580°F. The gas-liquid pressure is 500 pounds at 150°F.

For hot oil, gasoline and general refinery service. Suitable for 300 lb SP., 750°F. and 500 lb. G.L.P., 150°F.

Regularly furnished with 12-14% chromium stainless steel seat rings, discs or disc rings and stems. Body necks are circular on 1½ to 6 in. inclusive. Face to face dimensions of 8, 10 and 12 in. valves do not permit the use of full circular body necks on these sizes because of inadequate clearance at this point, but they are made as nearly circular as possible. Body-bonnet fianges are circular in all sizes.

These valves are also available with by-pass in sizes 5-in. to 12-in. inclusive. They include an inside screw flanged steel globe valve bolted to forged steel nozzles welded to the body.

California Crude Oil Production

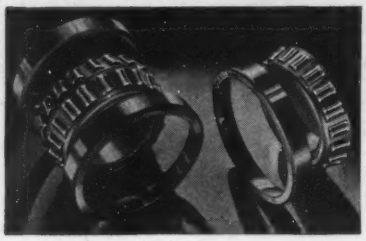
For Two Weeks Ended July 9, 1938

Field	July Daily Quota	Average Daily Production	Excess
San Joaquin Valley			
Belridge—North	15,360	11,515	*3,845
Belridge—South	1,810	1,066	*744
Buena Vista	17,480	17,685	205
Canal	2,400	2,647	247
Coalinga—East-West	16,653	11,504	*5,149
Coffee Canyon	3,210	3,603	393
Edison	2,565	3,018	453
Elk Hills	8,160	10,532	2,372
Fruitvale	6,911	7,950	1,039
Greeley	3,815	3,096	*719
Kern Front	8,266	7,607	*659
Kern River	5,385	2,490	*2,895
Kettleman No. Dome	65,440	66,726	1,286
Lost Hills	4,280	3,244	*1,036
McKittrick	3,540	3,038	*502
Midway	44,735	36,581	*8,154
Mount Poso	14,830	16,337	1,507
Mountain View	9,252	10,996	1,744
Rio Bravo	3,090	5,063	1,973
Round Mountain	10,190	10,993	803
Ten Section	6,990	6,425	*565
Other Fields	2,635	2,762	127
TOTAL	256,997	244,878	*12,119
Coastal Counties			
Elwood	5,665	5,576	*89
Rincon	3,005	4,185	1,180
Santa Maria	8,465	8,247	*218
Santa Maria Valley	18,925	4,273	*14,652
Santa Paula-Newhall	4,940	4,964	24
Ventura Avenue	32,695	35,857	3,162
Other Fields	5,745	5,772	27
TOTAL	79,440	68,874	*10,566
Los Angeles Basin			
Alamitos-Seal Beach	8,110	8,850	740
Brea-Olinda	8,570	5,331	*3,239
Coyote—East	2,845	3,203	358
Coyote—West	8,315	9,114	799
Domingues	22,150	24,303	2,153
El Segundo	6,880	9,642	2,762
Huntington Beach—New	13,935	18,526	4,591
Huntington Beach—Old	13,665	15,639	1,974
Inglewood	14,315	14,387	72
Long Beach	46,115	59,266	13,151
Montebello	6,699	6,399	*300
Montebello-West End	2,050	2,667	617
Playa del Rey	5,730	6,283	553
Richfield	8,080	8,592	512
Rosecrans-Athens	4,850	7,899	3,049
Santa Fe Springs	30,680	33,835	3,155
Torrance	9,725	15,824	6,099
Wilmington	65,579	93,649	28,070
Other Fields	2,645	2,619	*26
TOTAL	280,938	346,028	65,090
STATE TOTAL	617,375	659,780	42,4

*—Shortage.

Unmounted Roller Bearings Announced by Link-Belt Co.

Of interest to designers and builders of machinery equipment is the announcement that Link-Belt Co., Chicago, has placed on the market a very complete line of Link-Belt Shafer radial-thrust single-row and double-row roller



bearings in the naked or unmounted form, and that a new Book No. 1652, 12 pages, complete with engineering data for figuring applications, has been prepared, to cover the subject.

The text of the book stresses:

1. Free rolling action with unimpaired loading capacity, even in the presence of shaft deflection or misalignment, is assured.

2. No provision for misalignment need be made in the bearing housing or mounting.

3. Thrust capacity is provided by the roiler and race-way shapes and by angular position of the curved rollers between curved races.

4. Radial or thrust or any combination of radial-thrust loads will be carried equally as well and on the same full contact area under all conditions of alignment.

5. There is no possibility of rollers pinching or binding, and no need for auxiliary means of taking the thrust.

The new book gives dimensions, weights, load ratings at 500 r.p.m., and list prices, for both single-row and double-row bearings.

Engineering data, such as determination of radial load; load ratings; modifying factors; life factors; operation factors; speed factors; and formulae and examples covering all types of loading, also are included.

A copy of this new Book No. 1652 may be obtained by writing to Link-Belt Co., Chicago, Philadelphia, Indianapolis or other offices.

Spring Controlled Union Check Valve

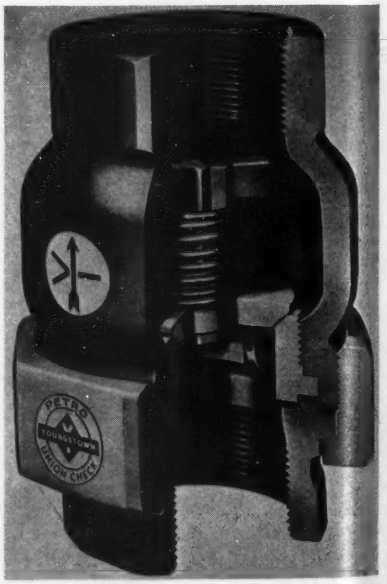
A spring-controlled forged steel union check valve for the petroleum industry is announced by The Youngstown Sheet & Tube Co. Designed to handle full pipe capacity, the valve is built for up to 600 pounds steam working pressure or 2,000 pounds cold working pressure.

The spring controls the opening and closing of the valve in accordance with the velocity of the flow yet is so designed that it is not affected by sudden fluctuations of flow or back pressure.

The valve has a hylastic vanadium cast steel body with tensile strength of 103,000 pounds per square inch, and poppet and seat of high temperature and corrosion resisting bronze known as U. S. Navy Bronze 88-10&2. The spring is made of phosphor bronze and will retain its tension on temperatures up to 650° F. The valve can be used in any position, vertical, horizontal or upside down.

Poppet, seat and spring are heavily chrome plated to resist the corrosive action of crude oil and acids. Examination and replacement of poppet, seat and spring can be made without removing the valve from the line.

The union check is made in three sizes for 2, 2½, and 3 inch pipe and is furnished with either standard or handle bar nut.



Left to right: Charles Wagner, Harry C. Morehouse, and J. A. Herron.

Name Wagner-Morehouse For Wickwire Products Sale

Wickwire Spencer Steel Co. announce the appointment of Wagner-Morehouse, Inc., as California distributors for Wickwire Oil Country Rope.

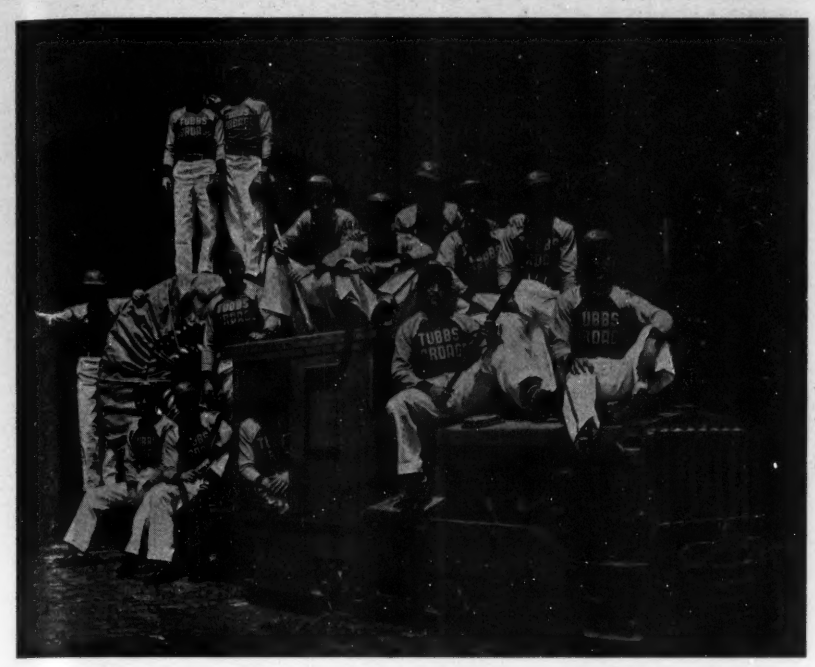
Wickwire products, known throughout the oil industry, have for many years been used by operating companies the world over, and Charley Wagner and Harry Morehouse, fully appreciating the quality of Wickwire Rope, are pleased to make this addition to their very carefully selected lines of drilling and producing equipment for sale to the oil industry.

Joe Herron, Southern California representative, of Wickwire, will cooperate in the sale and servicing of Wire Rope in the various fields. Wickwire Spencer Steel Co. has office and warehouse in Los Angeles at 214 North Alameda Street, and maintains adequate stock.

Wagner-Morehouse, Inc., have offices and warehouses, in Los Angeles, at 2371 East 51st Street, and in Bakersfield, at 1407 34th Street, with twenty-four hour service, to supply demands.

Complete stock of wire rope will be carried at Bakersfield.

Tubbs Cordage Sluggers



Phenomenally successful is the newly-formed baseball team of Tubbs Cordage Co., San Francisco rope manufacturing firm. Organized only last year, the Tubbs team is fighting for top honors in two Bay Area soft-ball leagues, the Exposition League and the San Francisco Recreation League. Playing in the Exposition League are teams of Hills Brothers Coffee, Envelope Corporation, Ecklund Auto Parts, Federal Motor Sales and Colyear Motor Sales, as well as the Tubbs team, which is now just one game behind the leader with four games yet to play. Speed is the Tubbs specialty, both in ball handling and base running. It has kept them out in front so far this season in the San Francisco Recreation League, where they are undefeated after two starts.

Richfield Production Increased Over 130%

Beginning with an estimated potential production of approximately 20,000 bbls. daily at the time of the company's reorganization in March a year ago, Richfield Oil Corp. has steadily increased its crude oil reserve until at present the estimated potential is placed at around 46,000 bbls. daily, an increase of roughly 130%.

In compliance with curtailment regulations, however, Richfield is actually producing only 22,000 bbls. of crude daily with the other 24,000 bbls. daily shut in. Current production of 22,000 bbls. daily compares with 17,000 bbls. of actual production in March a year ago.

While this comparison indicates an increase of over 29%, it does not reveal the correct relative importance of new production. Due to the normal decline in output from old wells, Richfield's current production, had no new wells been drilled, would be only a little over 12,000 bbls. daily. On this basis present production represents an increase of around 10,000 bbls. daily or over 83%.

Refinery requirements average roughly 40,000 bbls. a day. The 22,000 bbls. of current actual daily production represents 55% of the refinery requirement. Existing term contracts for the purchase of crude, together with the steadily increasing rate of company-owned production, assure Richfield of an adequate supply for an indefinite period.

Early this year Richfield announced an extensive production development program which, it was anticipated, would require an expenditure of from $2,500,000 to $3,000,000. Following out this program the company currently has ten drilling crews in the field. Of the ten wells now being drilled two are test wells and the other eight are located in proven territory.

Wells currently being drilled in proved areas include six in the Los Angeles basin, one at Rincon and one at North Belridge. The two test wells are located in the Potrero Hills and Wheeler Ridge districts. In addition Richfield jointly with the Barnsdall Oil Corp. is drilling a well in the Gato Ridge section.

Two more test wells will be started within the next 30 days. One of these will be located in the Union Avenue district and the other will be on a site northeast of Elk Hills.

Increased activity in its search for proven and prospective oil land is reflected in a material increase in the properties held by the company. Total property now owned in fee or leased amounts to slightly over 115,500 acres. This compares with 51,788 acres as of March 13, 1937, an increase of roughly 123%.

Wood Promoted

Wood Named Manager For Texaco Production

Several important shifts in personnel, in the producing department of The Texas Co. of California, were announced here today by C. E. Olmsted, president and general manager.

James T. Wood, Jr. has been named Manager of Texaco's producing operations here to succeed F. C. Sealey, who has been appointed to a New York post with The Texas Co. (Delaware). Mr. Wood's headquarters will be Los Angeles, as will also those of R. L. Keyes, former general superintendent who has been advanced to assistant manager.

In the same staff revisions, W. S. Rogers has been named assistant to Wood, W. H. Farrand has been appointed general superintendent, and H. C. Stone has been announced as Texaco's division superintendent at the Santa Paula headquarters.

Brooklyn Polytech Honors Dr. Egloff

The honorary degree of Doctor of Science was recently conferred upon Dr. Gustav Egloff by the Polytechnic Institute of Brooklyn.

Dr. Egloff is director of research of Universal Oil Products Co., Chicago.

Dr. Charles Edwin Potts, in charge of the ceremony said:

"For the brilliance of your scientific achievements, for the vision of your economic applications, and for the broad public benefits of your professional work, I confer upon you the degree of Doctor of Science with all its rights and privileges."

Dr. Vladimir K. Zworykin of the Radio Corp. of America and William H. Harrison of the American Telephone & Telegraph were similarly honored.

Others upon whom the Institute has conferred honorary degrees in past years include: President K. I. Compton, Massachusetts Institute of Technology; Charles F. Kettering, Central Motors; Admiral Richard E. Byrd; Dr. Laurence McK. Gould, Byrd Expedition; Professor Moses Gomberg, University of Michigan; Bancroft Gherardi, American Telephone & Telegraph Co.; Professor Percy W. Bridgman, Harvard University; Ralph F. Flanders, Jones and Lamson Machine Co.; Professor Roger Adams, University of Illinois; Professor Charles F. Scott, Yale University; John R. Carson, Bell Telephone Laboratories; Morris E. Leeds, of Leeds & Northrup Company.

Universal Will Not Operate Solvex Plant

Universal Oil Products is not now operating and does not expect to operate the Gladewater, Texas refinery of the Solvex Refinery Co., it was stated today by H. J. Halle, president of Universal. No change in policy for Universal is indicated by the acquisition of the refinery, it was stated. The company supplied some of the equipment used for the plant, which was erected about two year ago. It was shut down in March and is now being offered for sale. The refinery came into possession of Universal, it is understood, when the latter acquired a mortgage covering physical assets of Solvex Refining Co.

Distinguished by its careful arrangement of material, the revised edition of "Oil and Gas Law of California," by John Burton Amsbary and Jonah Jones, Jr., is useful to every oil executive and operator. The authors cover practically the entire field of petroleum jurisprudence, citing scores of cases in their analysis and explanation of statutes.

Axelson Advertising Is Given Recognition

The voting of first award to the Axelson Manufacturing Co.'s Life series advertisements and direct mail pieces by the Pacific Advertising Clubs Association Convention in Los Angeles last week brings further recognition to Axelson industrial display advertising. First interest in this series of advertisements has already been expressed by Life Magazine in their request for copies of the entire series for future use.

The P.A.C.A. Convention, consisting of all advertising clubs from Seattle, Washington, to San Diego, California, drew an attendance of some six hundred advertising men and women. Displays were entered in variously classified competitive events by many of the national, regional and industrial advertisers.

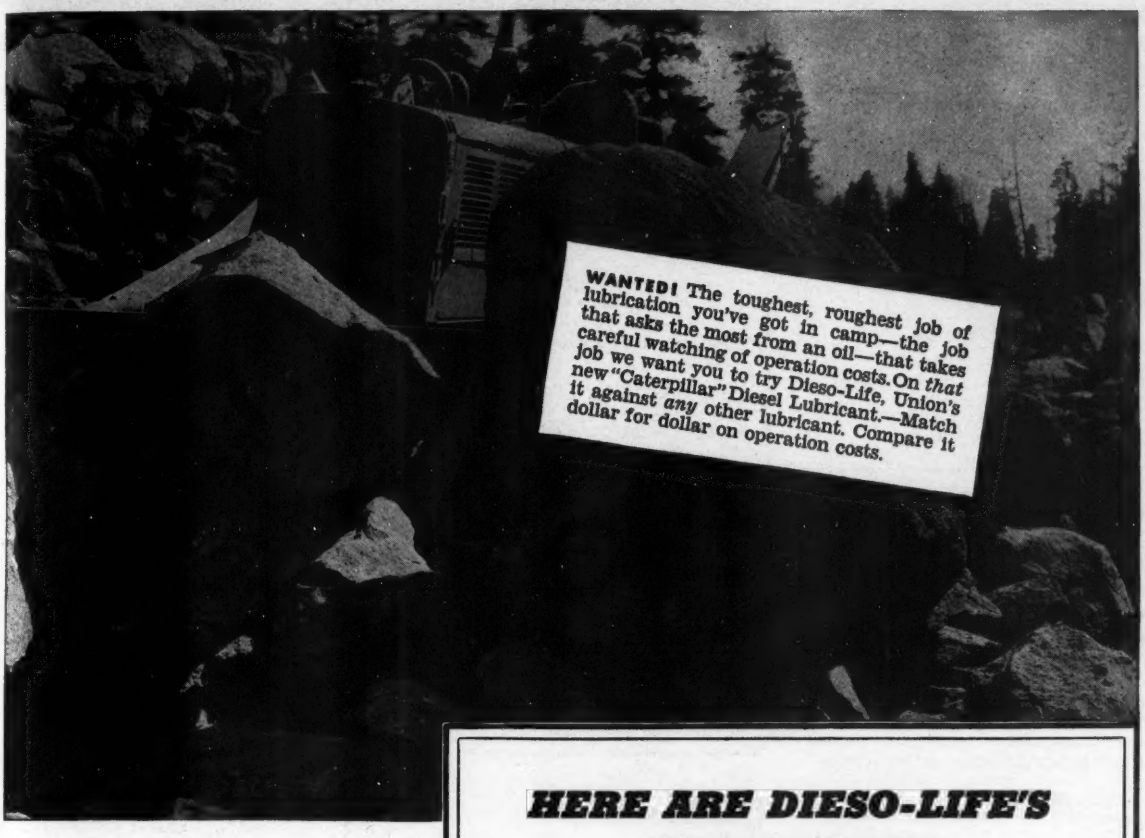
The award given the Axelson advertisements was rendered in the complete campaigns division.

Advertising for the Axelson Manufacturing Co. is handled by The McCarty Co.

Welsh of Plant Rubber Is Touring Scenic Spots

J. V. "Vern" Welsh of Plant Rubber and Asbestos Works left the middle of this month on an extended vacation touring through Grand Canyon, Zion National Park, Yellowstone, Glacier Park, Grand Coulee Dam and will visit relatives in British Columbia and return down the Coast. He is accompanied by Mrs. Welsh and complete camera equipment, he will no doubt return with many beautiful pictures, as he is a cameraman of no mean ability. Happy hunting Vern.

Give the Tough jobs to DIESO-LIFE!


WANTED! The toughest, roughest job of lubrication you've got in camp—the job that asks the most from an oil—that takes careful watching of operation costs. On *that* job we want you to try Dieso-Life, Union's new "Caterpillar" Diesel Lubricant.—Match it against *any* other lubricant. Compare it dollar for dollar on operation costs.

New "CATERPILLAR" LUBRICANT

CUTS OPERATION COSTS!

Union Oil Company invites you to check carefully, point-by-point, the following twelve advantages of DIESO-LIFE. We'd like to have you see how it out-performs *any* lubricant. Especially will we be glad to have you test it against the oil you are now using. We sincerely believe you'll never use any other lubricant.

DIESO-LIFE

Approved by Caterpillar Tractor Co.

UNION OIL COMPANY

HERE ARE DIESO-LIFE'S ADVANTAGES

1. Has tougher, longer-lasting film.
2. Prevents cylinder scratching or scuffing during cold-motor starting.
3. Prevents cylinder scratching or scuffing during break-in.
4. Prevents cylinder scratching or scuffing during periods of high overload.
5. Keeps rings clean and free. Prevents sticking.
6. Permits proper piston ring oil-seal and prevents blow-by.
7. Reduces liner wear. Lengthens engine life.
8. Has highest film strength. Affords greatest protection during severe service conditions.
9. Prevents accumulation of sludge. Insures open oil channels.
10. Prevents harmful carbon formation.
11. Guards against bearing failure.
12. Protects rubbing surfaces against temporary oil pressure failure.

Business and Professional Directory

THE
HANCOCK OIL COMPANY
of
CALIFORNIA

PRODUCERS - REFINERS
MARKETERS

J. R. PEMBERTON
Oil Umpire
1110 Security Title Insurance Bldg.
Los Angeles, Calif.
TRinity 9705

MARTIN VAN COUVERING
PETROLEUM ENGINEER
405 South Hill Street
LOS ANGELES
CALIF.
MIchigan 8781

GERARD HENNY, Ph.D.
Consulting Geologist
417 S. Hill St. Los Angeles
VAndike 7053

M. H. SOYSTER
Petroleum Engineer and Geologist
4321 Clinton St., Los Angeles, Calif.
TUcker 2458 OLympia 2786

LOUIS C. CHAPPUIS
Petroleum Engineer and Geologist
508 Wright & Callendar Bldg.
Los Angeles MUtual 4821

Classified Advertisements

CLASSIFIED ADVERTISING RATES

Small type: 50c per line per insertion. Count six words to a line. Minimum charge $2.00. All classified advertising payable in advance. Four consecutive insertions at price of three, if copy does not change.

24 times .....$ 7.50 per inch
1 time ..... 10.00 per inch

Not responsible for more than one incorrect insertion.

WATER DEVELOPMENT GUARANTEED

Water surveying service. David Ramey, Phone Wilmington 1918, 507 Broad Ave., Wilmington, Calif. tf

REFINERIES AND GASOLINE PLANTS

Reconditioned or new heat exchangers, stills, fractionators, absorbers, condensers, at cut prices. Plants designed any size for any use. W. F. Pyne, 909 Ardmore Ave., Los Angeles. DRexel 1412. tf

PIPE

5000 ft. 10¾" O. D. Std. P. E.; 2000 ft. 12¾" O. D. Std. P. E.; 4000 ft. 5" Drill, P. E. Line; 9000 ft. 6" Drill, P. E. Line.
IMPERIAL PIPE & SUPPLY CO., 2501 Santa Fe Ave., Los Angeles. JE. 1104. tf/b

WANTED

Wanted drilling rig. Rotary or cable tools. Capacity 2,000 to 4,000 ft. Give exact condition, location and lowest cash price. Box 27, c/o Calif. Oil World. 7/20-4

MAPS

Large map of Los Angeles Basin oil fields and map showing all California oil fields. Price $15.00 each on paper and $20 each on cloth. Individual state oil and gas maps of Mid-Continent and Rocky Mountain regions. Maps show geological cross sections at base. These maps indicate wells drilling, wells producing and abandoned, with depths.
All maps revised up to date of purchase.
JAMES C. BRANSFORD
1127 Story Bldg.
Los Angeles, Calif.
Phone: TUcker 7530

GRAYDON OLIVER
PETROLEUM ENGINEER
215 West 7th Street
Los Angeles, Calif. VAndike 3696

SMITH-EMERY CO.
Since 1904
Oils Tested
Shipments Certified
Tanks Strapped
Offices and Laboratories
820 Santee St. Los Angeles
651 Howard St., San Francisco

CORE ANALYSIS LABORATORY
(Incorporated)
Specializing in the physical determination of porosity, permeability, oil and water saturation of core samples.
P. O. Box 461 Ventura, Calif.
Telephone Ventura 6355

Oil Men's Calendar

September

California Natural Gasoline Assn. meets the first Thursday of each month.

5-9—American Chemical Society, Milwaukee, Wis.

14-16—Santa Barbara, Calif., annual meeting Pacific Coast Gas Association, Biltmore Hotel.

14-16—National Petroleum Assn., 36th Annual Meeting Hotel Traymore, Atlantic City, N. J.

21-23—National Industrial Advertisers Assn., Inc., 16th Annual Meeting, Cleveland, Ohio.

October

6-7—Society of Automotive Engineers, National Regional Fuels & Lubricants Meeting, Tulsa, Okla.

6-7—Petroleum Division A.I.M.E. fall meeting, San Antonio, Texas.

6-8—American Institute of Mining & Metallurgical Engineers, Industrial Minerals Division, Knoxville, Tenn.

13-15—Society of Automotive Engineers, Aircraft Production Meeting, Ambassador Hotel, Los Angeles, Calif.

20-21—Industrial Minerals Division and Petroleum Division A.I.M.E., Los Angeles.

November

1-15—American Institute of Mining and Metallurgical Engineers Regional Meeting, Tucson, Arizona.

14—Society of Automotive Engineers, Annual Dinner, Commodore Hotel, New York.

14-18—American Petroleum Institute 19th Annual Meeting, Stevens Hotel, Chicago, Ill.